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Promoting competition and investment in fibre networks: Wholesale Fixed Telecoms Market Review 2021-26

Volume 2: Market analysis

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Better broadband and mobile - *wherever you are*

STATEMENT:

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Contents

Section

1. Introduction

1.1 In this volume we set out our reasoning and decisions on identifying product and geographic markets and our significant market power (SMP) determinations for the following markets:

- physical infrastructure;
- wholesale local access (WLA);
- leased lines access (LL Access); and
- inter-exchange connectivity (IEC).

1.2 Having considered responses from stakeholders to the provisional market assessment we set out in our January 2020 Consultation, we have gathered more information to ensure a richer understanding of likely market developments over the review period. This includes refreshing our analysis of the LL Access and IEC markets and updating our analysis of current and forecast network coverage, noting potential impacts of the coronavirus (Covid-19) pandemic on build plans.

1.3 Our findings as regards market definition and SMP are broadly the same as those we set out in our provisional assessment. We have made some adjustments based on the evidence we have collected.

1.4 We set out in Volumes 3, 4, 5 and 6 the remedies we have decided to impose in the markets where we have determined that BT has SMP.

1.5 We also set out in this volume our decision to remove all SMP regulation from BT in the legacy markets for wholesale fixed analogue exchange lines (WFAEL), wholesale ISDN2 and ISDN30, and wholesale broadband access (WBA). We must deregulate these markets on the grounds that the three-criteria test set out in section 79((2B) of the Act is not met.

Residential and business services included in this review

1.6 In this review we are considering telecoms services provided at a fixed location. These locations include residential and business premises. The main retail services delivered include telephony, broadband and TV for residential customers; and for business customers, telephony, broadband (often in packages suited to businesses), and managed high capacity services based on leased lines.

1.7 Telephony and broadband services are typically provided over a local access network and there are many different local access network technologies, each with different capabilities. The main access network technologies are, copper wires, fibre-to-the-cabinet (FTTC) which uses a combination of copper wires and fibre cables, hybrid fibre-coaxial (HFC) cable network and full-fibre (fibre-to-the-premise (FTTP)).[1] This review covers all of these access network technologies.

[1] These are discussed in Annex 2.

1.8 Over the past two decades access networks have been developing to support increasingly higher broadband speeds and the latest developments are able to support speeds of 1000Mbit/s (1Gbit/s) or more. Accordingly, these latest networks are referred to as gigabit capable. The two main access network technologies that are gigabit capable are HFC and full-fibre.

1.9 Retail services provided to residential consumers are currently provided over a local access network. Retail services provided to business customers are also provided over the same local access network. However, business customers sometimes use a dedicated connection, usually fibre, known as a 'leased line'.

1.10 Larger businesses may rely more on leased lines, with SMEs using more local access networks, although this will depend on the requirements of the business. For example, a large business or public sector organisation with many sites may use a mix of leased lines and local access connections.

1.11 Leased lines are also used to provide connections to mobile network base stations and data centres, and as part of operators' networks (particularly to provide backhaul connections between BT exchanges and other operators' network locations). Leased lines can be provided as an active service (which includes the electronics) or just the fibre connection, which we refer to as dark fibre.

1.12 Telecoms services provided to customers on the move are not part of this review. However, wireless connections (using mobile, satellite or fixed wireless technology) may be used to deliver some retail services at a fixed location (for example, to deliver telephony and to provide broadband connections for some residential customers) and we therefore take these into account where relevant in this review.

Markets we are reviewing

1.13 In this review we set out our findings and decisions on the wholesale markets that support retail telecoms services provided at fixed locations.

1.14 There is significant ongoing and planned investment in deploying new networks and expanding existing networks over the period of this review, which will deliver better services such as gigabit-capable broadband. Different companies take different approaches to where and how they deploy their networks and the services that they provide. There is, however, the potential for new competing networks to be deployed in large parts of the UK providing a wide range of services. As set out in Volume 1, our approach to supporting investment in gigabit-capable networks is focused on encouraging competition between different networks where viable, which will provide high quality services, choice and affordable broadband for consumers throughout the UK.

Current networks and developments over this market review period[2]

1.15 The two main networks providing access services to residential, business and public sector customers, as well as backhaul services for mobile network operators (MNOs), across large parts of the UK are BT (operated by Openreach) and Virgin Media.

1.16 Openreach mainly supports superfast broadband services using FTTC technology, which is available across most of its national network. However, it has also been upgrading its network by deploying FTTP. It currently covers approximately 4.5m premises with FTTP allowing it to supply gigabit speeds to these premises. It plans to extend its FTTP footprint to 20m premises by the mid-to-late 2020s.

1.17 Virgin Media operates a mainly HFC network which currently reaches around 15m premises; covering most urban areas of the UK. This network already supports ultrafast broadband services[3] and is in the process of being upgraded to provide gigabit broadband by the end of 2021. Virgin Media has been expanding its network using HFC and FTTP since 2015. This investment (called Project Lightning) is expected to continue over the next few years and may reach in the region of 2m more homes and businesses.

1.18 There is significant additional activity in deploying new networks, or expanding existing networks, in the UK. In particular, CityFibre has announced plans to build to over 60 towns and cities and to cover 8m premises by 2026. CityFibre plans to build city-wide fibre networks able to meet all forms of demand for data connectivity at most fixed locations in those places.

Table 1.1: Current Virgin Media and CityFibre coverage and announced roll-out plans

Provider	Current coverage[4]	Total planned coverage at 2026
Virgin Media	14.9 million	17 million[5]
CityFibre	0.4 million	8 million[6]

[2] See Annex 3 for further detail on network build in the UK.
[3] Offering download speeds of 300Mbit/s or more but less than 1Gbit/s.
[4] As at September 2020, Connected Nations 2020.
[5] Virgin Media and Liberty Global announce largest investment in UK's internet infrastructure for more than a decade | Virgin Media 13 February 2015 [accessed 1 March 2021].
[6] CityFibre completes its acquisition of FibreNation increasing its rollout plans to pass up to 8 million premises – CityFibre, 27 March 2020 [accessed 1 March 2021].

Our approach to market analysis given the potential for network roll-out

Physical infrastructure market

1.19 Physical infrastructure is a key component of network build. While network builders can build their own physical infrastructure, many telecoms providers assume access to existing telecoms physical infrastructure owned by BT as a significant element of their build plans.

1.20 We start with our decisions on the physical infrastructure market.[7]

Consideration of network markets downstream of physical infrastructure

1.21 In the period of this review, it is important that we recognise the potential for network investment and roll-out. A lot of the current and planned investment is targeted at building networks that will support a broad range of services and customer types. As such, our approach to regulation of one set of services takes account of the impact that this may have on investment and competition in other services.

1.22 We have previously considered the markets downstream of physical infrastructure (WLA, LL Access and IEC) separately. However, operators' investment in network deployment could mean that the same networks compete to supply all services in a geographic area, which could result in the competitive dynamics being similar for each of the services. We think these conditions could develop during the period of this review so that in future reviews there could be a strong case for considering a single product market for networks. For this review, we think it is right to continue to base our formal market analysis on separate product markets (WLA, LL Access and IEC). However, when considering our remedies, we consider the impact that operators' roll-out will have across all of these markets, to ensure that our objectives are best met.

1.23 As the extent of network roll-out will vary across the UK, a central issue in our approach to geographic market analysis is to differentiate areas where there is, or there is likely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks, and geographic areas where there is not, and there is unlikely to be such potential. We also consider areas where competition from service-specific networks is particularly strong – currently leased lines only networks in central London and business districts in other major cities.

Structure of the rest of this volume

1.24 The rest of this volume is structured as follows:

- Section 2 sets out background information on the retail and wholesale markets for the provision of broadband and leased lines services.

[7] We explain in Annex 1 why, when markets are vertically linked, we start by reviewing the most upstream market first.

- Section 3 sets out our decisions on product market definition in the physical infrastructure market.
- Section 4 sets out our decisions on geographic market definition and the three criteria test in the physical infrastructure market.
- Section 5 sets out our decisions on SMP in the physical infrastructure market.
- Section 6 sets out our decisions on product market definition in the WLA, LL Access and IEC markets.
- Section 7 sets out our decisions on geographic market definition and the three criteria test in the WLA, LL Access and IEC markets.
- Section 8 sets out our decisions on SMP in the WLA, LL Access and IEC markets.
- Section 9 sets out our decisions on the WFAEL, ISDN 2 and ISDN 30 markets.
- Section 10 sets out our decisions on the WBA markets.

2. Market context

2.1 In this section we set out background information on the retail and wholesale markets for the provision of broadband and leased lines services. This covers:

- For broadband services:
  - a description of residential and business broadband products;
  - current and forecast volumes and market shares;
  - analysis of the drivers of the take-up of higher speed services and of recent trends in the use of data;
  - analysis of retail broadband pricing for fixed and mobile services; and
  - survey and other information on consumer preferences and behaviour.
- For leased lines services:
  - a description of leased lines products, services and customers; and
  - discussion of current and future usage of leased lines services.

2.2 This section has been updated following the January 2020 Consultation.

Retail broadband

Summary of retail broadband analysis

2.3 Based on the evidence that we present below, we summarise our findings as follows:

- The majority of customers take broadband as part of a bundle of services. Internet service providers (ISPs) offer a range of differentiated packages including packages offering different speeds and packages tailored to the needs of business customers. Price and value are the most important factors in the choice between available broadband packages followed by reliability and speed.
- Currently around 96% of premises have access to speeds of at least 30Mbit/s and 59% of premises have access to speeds above 300Mbit/s (largely due to Virgin Media's network).[8]
- Around a quarter of households are still receiving speeds less than 30Mbit/s.[9]
- Looking forward, indicative forecasts based on information provided by network operators and ISPs suggest that by 2025, less than 5% of people will be subscribing to standard broadband, over 60% to 30Mbit/s up to 80Mbit/s, over 25% to 80Mbit/s up to 300Mbit/s and around 10% to services of 300Mbit/s or above.[10]
- Analysis of the advertised prices for products being offered by different ISPs, as well as prices being paid by existing customers, shows that there is considerable overlap in the prices of products offering different speeds.

[8] Ofcom, 2020. *Connected Nations 2020*.
[9] Ofcom, 2020. *UK home broadband performance*.
[10] Ofcom analysis of information provided by networks and ISPs.

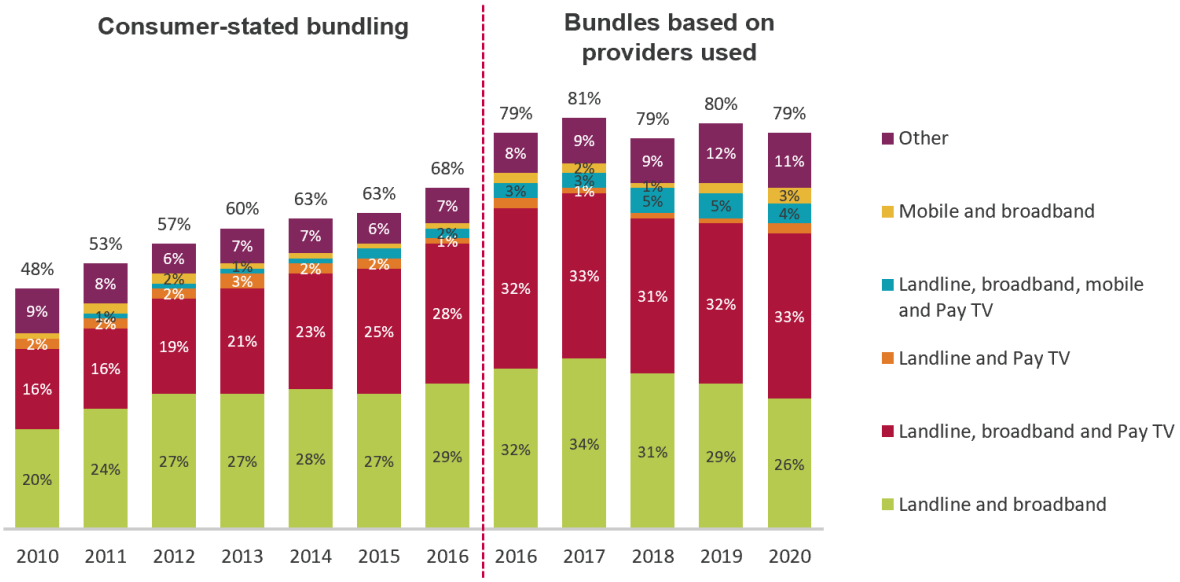
- Price differentials between 40/10- and 80/20-based products have narrowed as ISPs seek to encourage mass market customer upgrades to the faster speed product.[11]
- In addition, ISPs are actively migrating their standard broadband customers to 40/10- and 80/20-based services, at no additional charge, motivated by Openreach pricing and the potential for reduced churn.
- Dissatisfaction with the quality of broadband services (including speeds and reliability) has been a factor behind customer turnover. This, combined with evidence on growth in the use of data, suggests that there is some demand for faster and more reliable broadband services.
- It appears that current products are meeting the needs of most people, which seems to be reflected in current levels of satisfaction with broadband speeds. The evidence indicates that this satisfaction was sustained throughout the first Covid-19 lockdown period when broadband use increased.
- Consumers tend to have a low willingness to pay for higher speeds, given that most remain price sensitive, but there are some people who would be prepared to pay a substantial premium for 1Gbit/s services. Some evidence also suggests that consumers would downgrade in response to increases in price differentials between speeds.
- MNOs provide 4G- and 5G-based home broadband services and the prices for these are similar to higher speed fixed broadband services.[12] But these services often have up-front charges and data usage caps on standard packages which can make them less attractive compared to fixed broadband alternatives. In addition, these services may not be available in more rural areas.[13]

Retail broadband products

2.4 A large majority of consumers now take broadband as part of a bundle of services, as shown in Figure 2.1. Our consumer research shows that in 2020, 79% of UK adults took a bundle of services, the majority of which include broadband, with 38%[14] taking landline and broadband in a bundle with Pay TV. Looking ahead, we expect that a large majority of businesses and homes will continue to take broadband as part of a bundle of services.

[11] When referring to price differentials, we mean the difference in price between two separate products rather than the difference in price for an equivalent service (which was the focus of our July 2020 broadband pricing review). For 40/10, we are referring to a product with download speeds of up to 40Mbit/s and upload speeds of up to 10Mbit/s – similarly 80/20 refers to an up to 80Mbit/s download speed and up to 20Mbit/s upload speed.
[12] Home broadband services are also referred to as fixed wireless access (FWA).
[13] See Annex 2.
[14] This sums to 38% due to rounding with decimal points.

Figure 2.1: Bundling of retail broadband, voice, mobile and TV services[15]



Source: Ofcom technology tracker.[16]

"Other" includes a number of different bundle combinations: broadband and Pay TV; landline, mobile and broadband; landline and mobile; mobile, broadband and Pay TV; landline, mobile and Pay TV; and mobile and Pay TV.

2.5 All ISPs offer a range of products differentiated by the services included, choice of headline broadband speeds and performance. There may also be differences in contract length (most common contract lengths being 12, 18 or 24 months) and the availability of discounts or other offers (e.g. reward cards).[17] This differentiation of packages and speeds offered is accompanied by a range of different price points.

2.6 Some of the ISPs providing residential services also offer a range of broadband packages targeted at business users. There are also a large number of smaller ISPs who are specialist providers of business broadband services.[18] These products typically offer a range of additional features (compared with residential broadband products) such as increased customer support and higher service standards.[19] Products may also be tailored to the

[15] The methodology was revised in 2016 to report the proportion of UK adults purchasing multiple services from a single provider, based on the stated main provider used for each service. Previously, the data related to the proportion of customers self-reporting a 'bundle' of services. Analysis from 2016 onward now also includes those who pay line rental in addition to their broadband service as a bundle.
[16] Base: All adults 16+ (2010, 9013) (2011, 3474) (2012, 3772) (2013, 3750) (2014, 3740) (2015, 3756) (2016, 3737) (2017, 3743) (2018, 3730) (2019, 3909) (2020, 3959). Base excludes those who do not know the provider for one or more services.
[17] See: [✂] response dated [✂] to the s.135 notice dated [✂], [✂]; and [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[18] Ofcom, 2015. *Broadband Services for SMEs: Assessment and Action Plan*, paragraph 5.11.
[19] Other examples of additional features include cloud apps (e.g. Office 365 or Dropbox), static IP addresses and faster upload speeds.

needs of different types and size of organisation.[20] However, around 30% of small to medium-sized enterprises (SMEs) subscribe to residential broadband products.[21]

Retail service providers and market shares

2.7 Most residential and business customers buy services from BT (across its main BT brand and the other brands it owns – EE and Plusnet), Virgin Media, TalkTalk, Sky or Vodafone. In more recent years, several new network operators such as Hyperoptic and Gigaclear have entered the market as vertically integrated providers offering retail fibre broadband to homes and businesses.

2.8 Table 2.2 provides estimates of the share of active retail broadband connections in the UK in 2019, by retail ISP. This shows that BT, Virgin Media, TalkTalk and Sky, taken together, accounted for most (88% share) of the retail broadband connections.

Table 2.2: Retail shares of different ISPs in 2019

ISPs	Share of broadband connections (%)
BT	34
Sky	23
Virgin Media	20
TalkTalk	11
Others	12

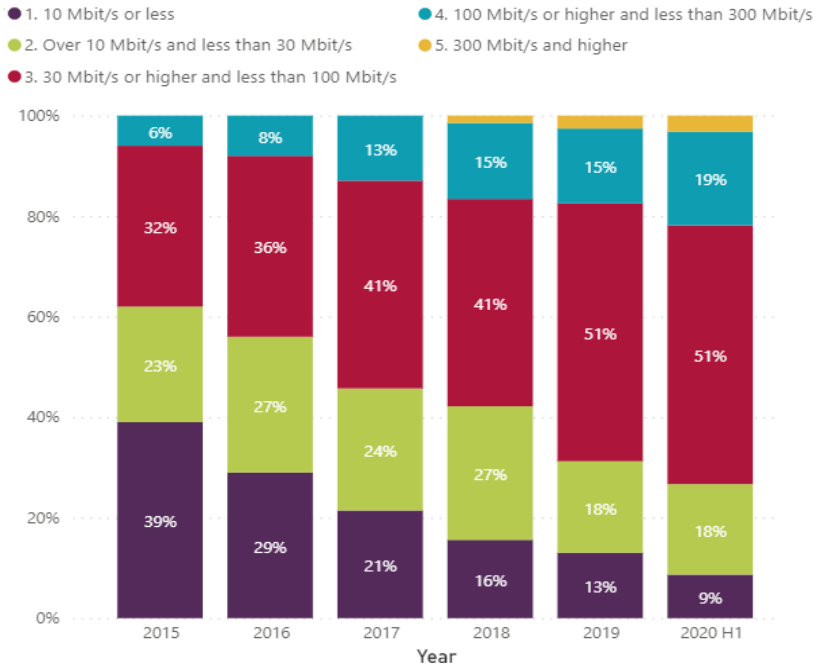
Source: Ofcom, Communications Market Report 2020: Interactive Data, Telecoms industry: Fixed, Lines and connections, Fixed broadband connections by ISP (%), page 15 [accessed 18 December 2020].
Note: BT includes Plusnet and EE.

Broadband connections by speeds

2.9 Figure 2.3 shows UK residential broadband connections by actual average download speeds from 2015 to the first half of 2020. The graph shows an increasing proportion of UK customers taking 30Mbit/s or higher and less than 100Mbit/s broadband services, and a fall in those customers taking 10Mbit/s or less broadband services.

[20] For example, Virgin Media offers products for Small (1-20 people), Medium (20-250 people) and Enterprise (250+) businesses, the public sector and for partners. See https://www.virginmediabusiness.co.uk/connectivity/internet-access/business-broadband/?CMP=ext_b2c_bb_mnu?CMP=ext_b2c_bb_mnu [accessed 18 December 2020].
[21] Ofcom, 2017. *The SME experience of communications services: research report*.

Figure 2.3: UK residential broadband connections, by actual average download speed, 2015 to 2020 H1

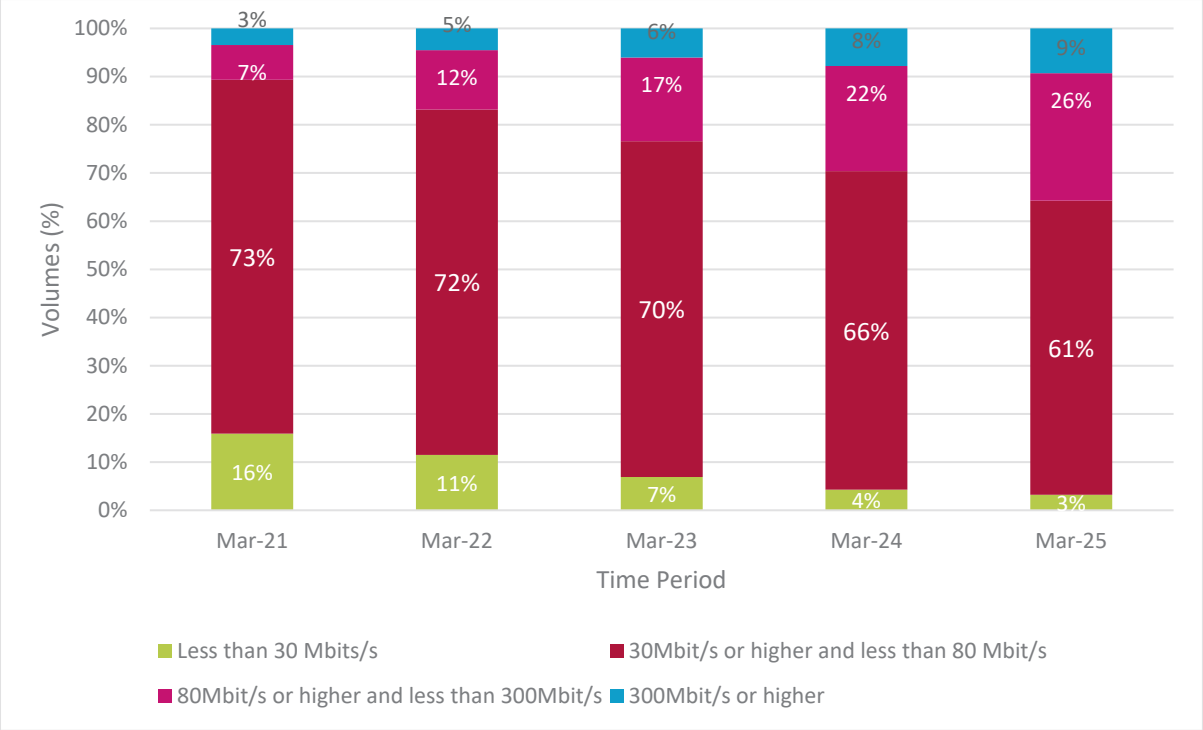


Source: Ofcom, 2020. UK home broadband performance – interactive report, page 2.

2.10 Figure 2.4 shows results of an indicative forward-looking analysis of connections by broadband speeds based on volume data provided by network operators and ISPs. We asked for these volumes to be based on realistic measures of speed.[22] This indicates the number of standard broadband connections falling to less than 5% of connections by March 2025.

[22] Specifically, in accordance with our statement *Better Broadband Speeds Information: Voluntary Code of Practice*, 1 March 2018 see https://www.ofcom.org.uk/__data/assets/pdf_file/0024/111696/statement-broadband-speeds.pdf.

Figure 2.4: Forward looking analysis of UK broadband connections, by speed: 2021-25



Source: Ofcom forecast based on information provided by relevant parties. [23]

2.11 Table 2.5 shows an analysis of BT, TalkTalk, Sky and Virgin Media customers, in September 2020, by advertised broadband speeds. This shows that there are material differences in the take-up of speeds between 30Mbit/s and 300Mbit/s. However, statements in internal documents suggest that all ISPs expect the trend in the take-up of higher speed services to continue.[24]

[23] [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; [✂] response to the s.135 notice dated [✂]; and [✂] response to the s.135 notice dated [✂].

[24] [✂] report that its residential customer mix has trended towards higher speed packages over 2013-19. See [✂] response dated [✂] to the s.135 notice dated [✂], [✂], page 27; and [✂] report an increase in the proportion of its customers taking fibre services from 2015 onwards and forecast that this will continue to increase in the coming years. See [✂] response dated [✂] to the s.135 notice dated [✂], [✂].

Table 2.5: Customers by different broadband speeds – BT, Sky, TalkTalk and Virgin Media[25]

Broadband speed	Take-up (in %) as of Sept 2020			
	BT	Sky	TalkTalk	Virgin Media
Standard BB	[✂]	[✂]	[✂]	[✂]
30Mbit/s-80Mbit/s	[✂]	[✂]	[✂]	[✂]
80Mbit/s-300Mbit/s	[✂]	[✂]	[✂]	[✂]
300Mbit/s+	[✂]	[✂]	[✂]	[✂]

Source: Ofcom estimates based on operator take-up data.

2.12 We asked ISPs to provide information on the volume of people moving to higher and lower speeds (referred to as upgrading and downgrading) excluding provider-led moves.[26] While the data only captures customers changing speed with the same provider (i.e. it excludes those changing speed when switching provider), the information provided indicates significantly more upgrades than downgrades (as expected when the market is generally moving towards higher speeds and attractive pricing is encouraging upgrades).

2.13 In addition to these customer movements, as discussed below, the evidence shows that a substantial proportion of customer movements to higher speeds has been the result of provider-led initiatives to move their existing customers at no extra charge to faster services. For example, based on information provided by ISPs,[27] we estimate that a substantial proportion ([✂]) of customer movements to 80/20-based services or faster (with the same service provider) between January 2017 and June 2020 have been provider-led.[28]

Openreach WLA volumes by speeds

2.14 Figure 2.6 gives a breakdown of Openreach wholesale broadband lines by speed for 2016/17 to 2019/20 (note that these speeds will not necessarily match those received by each customer). The 40/10-based service[29] and below accounted for [✂]% of all Openreach lines in 2016/17 falling to [✂%] in 2019/20 (if the figures for the 55/10-based

[25] Percentage figures are rounded to the nearest integer. Virgin Media's volumes are split by 30-100Mbit/s and 100-300Mbit/s, instead of 30-80Mbit/s and 80-300Mbit/s.
[26] [✂], [✂], and [✂] provided data on separate provider-led and customer-led movements. [✂] and [✂] provided provider-led migrations data but could not isolate its customer-led movements. Provider-led upgrades are defined as customers being moved to higher speeds by their provider at no extra charge to the customer.
[27] This is based on figures from [✂], [✂], and [✂]. [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 3; [✂] response dated [✂] to the s.135 notice dated [✂], question 3; [✂] response dated [✂] to s.135 dated [✂], question 3.
[28] On the remaining [✂], these were categorised by the providers as being customer-led, but some of these customers may have chosen to upgrade as a result of available offers or small price premiums.
[29] Openreach's 40/10 FTTC and FTTP services which provides download speeds of up to 40Mbit/s and upload speeds of up to 10Mbit/s. Openreach's 40/2 volumes are included in this group.

products are added to the 40/10, the figures are [✂]% to [✂]% respectively).[30] The corresponding volumes for the 80/20-based service increased from [✂]% to [✂]% of total Openreach lines.

Figure 2.6: Openreach wholesale broadband lines 2016/17 to 2019/20, in relative terms

[✂]

Note: All volumes except copper lines are year-end figures, provided by Openreach in response to an s.135 notice. Copper volumes were mid-year figures from RFS data and have been averaged across two years to estimate year-end volumes. 2019/20 year-end copper volumes were calculated using 2019/20 mid-year volumes and an Ofcom forecast of copper volumes in 2020/21. Volumes are the lines provided by Openreach, but do not necessarily match to the speed received by each customer.[31]

2.15 Figure 2.7 shows forecasts based on information provided by [✂][32], [✂] and [✂] (which, taken together, accounted for [✂][33] of Openreach lines in March 2020). As with Figure 2.4, we asked for this information to be based on realistic measures of speed, which means that volumes delivered using the Openreach 80/20 wholesale product will be in the range of 55Mbit/s and higher and less than 80Mbit/s. These suggest a slightly faster uptake of 80/20 (or higher) speeds than previous Openreach's forecasts.[34] For example, these forecasts suggest that by March 2025 around 48% of their customers will be subscribing to services offering speeds in the range of 55Mbit/s up to 80Mbit/s.

[30] 55/10 provides services broadly similar to those of a 40/10 connection. We are not aware of any non-BT ISPs signing new customers up onto the 55/10 product except for a very small number of [✂] who sell 55/10 instead of 40/10. [✂] response dated [✂] to s.135 notice dated [✂], question 1.

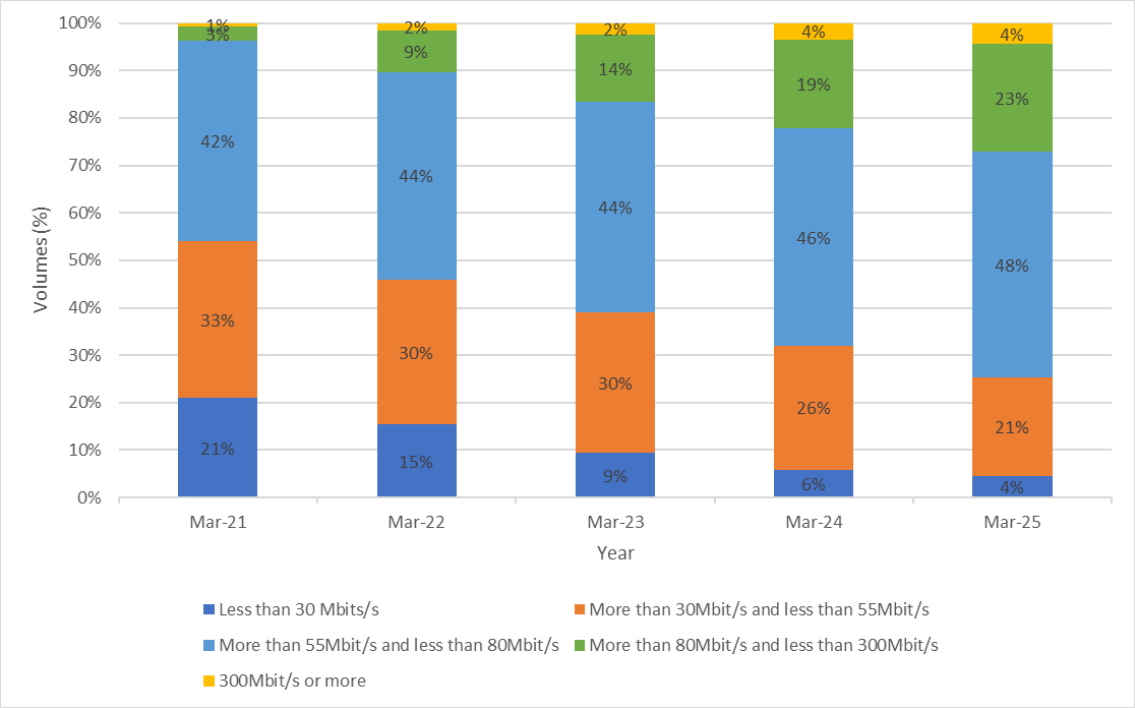
[31] For non-copper volumes, see Openreach's response dated 29 May 2020 to the s.135 notice dated 26 February 2020, questions 6, 7, 8. For copper volumes, this is from Ofcom's own modelling, using RFS data.

[32] The forecast is for [✂].

[33] Ofcom calculation based on provider data in March 2020, as a proportion of Openreach lines at the end of the 2019/20 financial year. Please see the note accompanying Figure 2.6 for an explanation of how total Openreach lines were calculated.

[34] Last year, Openreach forecasted that take-up of the FTTC 40/10-based service would increase from 20- 30% [✂]% of all Openreach lines by 2019/20 to 35- 40% [✂]% by 2023/24 (adding the 55/10 service these figures are [✂]% and [✂]% respectively). The corresponding figures for higher speed services (80/20-based and above) are [✂]% and [✂]% respectively (see Figure 2.7 in the January 2020 Consultation). Therefore, Openreach forecasted that speeds of 40/10 (55/10) or below would continue to account for the majority of Openreach's sales by 2023/24, notwithstanding Openreach's efforts to move FTTC volumes onto higher speeds (see below for details of Openreach's GEA discount schemes). Openreach's response dated 26 September 2019 to the s.135 notice dated 21 August 2019. Openreach was unable to provide us with updated volume forecasts.

Figure 2.7: Proportion of customers on different bandwidths, [✂] cumulative forecasts



Source: Cumulative forecasts provided by [✂].[35]

Note: [✂] forecasts were projected up until September 2024, therefore we forecast its March 2025 volumes based on its data up until this point.

Role of wholesale arrangements in driving take-up of higher speeds

2.16 In 2018 [✂], [✂], [✂] and [✂] signed up to the Openreach GEA volume offer, which provides significant discounts contingent on achieving targets for increasing their volumes of faster broadband connections, over a five-year period.[36] If an ISP achieves its targets the wholesale charge differential between 40/10 and 80/20 FTTC decreases from £4.95[37] to £1 a month[38] until 2023, and the differential between 40/10 and 160/30 FTTC decreases from £6.49 to £3. We understand that these volume commitments have driven some recent uptake of 80/20-based products e.g. [✂] migration of [✂] customers to 80/20 (mentioned below) was driven by this.

2.17 The scheme also contains a 'try before you buy' provision which allowed ISPs (within the first year of signing the contract) to migrate up to 50% of their current 40/10- or 55/10-

[35] [✂] response dated [✂] to the s.135 notice dated [✂], question 1; [✂] response dated [✂] to s.135 dated [✂], question 1; [✂] response dated [✂] to s.135 dated [✂], question 1.
[36] Based on the generic contract available on the Openreach website, by 2022: 84% of an ISP's total broadband base in 2018 must be supplied using Fibre; 25% of that base must be on 80/20; and 12.5% of the total 2018 base must be supplied superfast using G.fast or FTTP. See https://www.openreach.co.uk/orpg/home/products/superfastfibreaccess/downloads/Openreach_Special_Offer_GEA_Volume_Agreement.pdf [accessed 29 November 2019].
[37] Openreach's current list price differential between 40/10 and 80/20 FTTC is £4.95/month (£12.53/month compared to £17.49/month).
[38] Generic GEA contract gives the following prices: £4.99/month for 40/10; £5.99/month for 55/10 and 80/20; and £7.99/month for 160/30.

based FTTC customers to 80/20-based services for twelve months free of additional charges.[39] We understand that this provision has been one driver of recent uptake of 80/20-based services.

2.18 One of the significant drivers of Openreach's 2018 GEA volume offer was a desire to incentivise ISPs to migrate their customers onto 80/20-based products.[40] Openreach considered that, absent the agreement, the wholesale price differential would be a barrier to the take-up of 80/20-based services. [✂].

ISP migrations

2.19 By 2018 Virgin Media had upgraded its standard broadband customers[41] and BT had upgraded subscribers whose line could support the faster 80/20-based service.[42] Since then we have seen more customers being upgraded, free of charge. ISPs have shared the following details of these migrations with us:

- Sky told us that its migration of [✂] customers from 40/10- to 80/20-based services in late 2018/early 2019 was supported by Openreach's discounted offer prices.[43] Sky also said Openreach's offer to migrate these customers on a free of charge basis for 12 months supported this migration.[44]
- [✂] also confirmed that they made use of the GEA volume offer to migrate [✂] customers on [✂]- to 80/20-based products in [✂].[45, 46]
- Between [✂], [✂] migrated [✂] standard broadband customers to [✂]- or 80/20-based services.[47, 48]
- [✂] migrated [✂] standard broadband customers to 40/10-based services, driven partly by Openreach GEA volume commitments, as well as to give a better customer experience and reduce the cost to serve.[49]

[39] After twelve months the appropriate rental charges resume but no modification charges accrue to remain on that speed or to be downgraded to the original speed.
[40] Our review of Openreach's board documents relating to the 2018 GEA discount agreement found that one of the significant drivers of the agreement was Openreach's desire to incentivise ISPs to migrate their customers onto higher bandwidth products. Openreach considered but rejected the alternative option of leaving prices of products above 40/10 unchanged because it believed the large price differential compared to the 40/10 product would prohibit migrations to higher bandwidths, which is consistent with our view that the majority of customers are unwilling to pay significantly more for higher speeds and are unlikely to in the near future.
[41] 2018 WLA Statement, page 74, 75.
[42] 2018 WLA Statement, page 190.
[43] Sky response dated [✂] to the s.135 notice dated [✂], question 3.
[44] Sky response dated [✂] to the s.135 notice dated [✂], question 2.
[45] This includes [✂] and [✂]. [✂] say this was motivated by Openreach waiving the modification charge as part of the GEA Special Offer.
[46] [✂] response dated [✂] to s.135 dated [✂], question 4.
[47] This includes [✂] and [✂]. This was not motivated by the GEA contract.
[48] [✂] response dated [✂] to the s.135 notice dated [✂], question 4 and [✂] response dated [✂] to the s.135 notice dated [✂], question 3.
[49] [✂] response dated [✂] to s.135 dated [✂], question 3.

- [✂] migrated [✂] customers from standard broadband to FTTC[50] and [✂] from standard broadband [✂] to faster standard broadband services of [✂].[51, 52]
- Since [✂], [✂] has migrated up to [✂] customers to speeds equal to or higher than [✂][53] and has plans to migrate [✂] [✂] customers to [✂].[54]

2.20 In addition to provider-led migrations, some ISPs have offered customers a non-automatic free speed upgrade. In these cases, there is generally no extra charge for the speed upgrade, but the ISP does not automatically place customers on the new contract. Examples include:

- Between [✂] and [✂], [✂] [✂] customers opted for a free speed upgrade from standard broadband to [✂]- or 80/20-based services.[55, 56]
- Between [✂] and [✂], [✂] [✂] customers upgraded from standard broadband to 40/10-based services, [✂] of whom incurred no extra cost.[57]

2.21 Internal documents and responses from stakeholders suggest that the upgrades listed above have been motivated by both Openreach's GEA volume offer and the opportunity to reduce customer turnover. For example, both [✂] and [✂] told us that one motivation for migrating customers to higher speeds was to reduce customer turnover.[58] [✂] told us that free of charge upgrades could increase customer satisfaction and, hence, reduce customer turnover as well as being a response to our consumer fairness agenda.[59]

Wholesale prices

FTTC prices

2.22 Openreach's internal documents suggest that its strategy is to set prices for headline speeds based on 80/20 lines and above which are low enough to motivate ISPs to move customers up the 'bandwidth ladder' but maintains enough of a premium that 'value is retained'.[60] Its wholesale FTTC 40/10 and 80/20 list price differential has remained steady, rising slightly from £4.82 to £4.95 since our main consultation was published in January 2020.

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[50] [✂] were migrated at some point since 2017 from [✂] ADSL to FTTC (up to 80Mbit/s) and [✂] were migrated between [✂] and [✂] from ADSL to FTTC (speeds not included).
[51] Most of these customers were migrated at some point since 2017, and [✂] were migrated between [✂] and [✂]. These customers were migrated from [✂] or [✂] to [✂].
[52] [✂] response dated [✂] to s.135 dated [✂], question 3.
[53] Customers may have been involved in more than one migration, therefore the number of customers migrated is likely to be less than [✂].
[54] [✂] response dated [✂] to s.135 dated [✂], question 7.
[55] This includes [✂] and [✂].
[56] [✂] response dated [✂] to the s.135 notice dated [✂], question 4 and [✂] response dated [✂] to the s.135 notice dated [✂], question 4.
[57] [✂] response dated [✂] to the s.135 notice dated [✂], question 3.
[58] [✂] response dated [✂] to the s.135 notice dated [✂], [✂] and [✂] response dated [✂] to the s.135 response dated [✂], response to question 7.
[59] [✂] response dated [✂] to s.135 dated [✂], question 4.
[60] Openreach's response dated 1 November 2019 to the s.135 notice dated 18 October 2019, [✂].

2.23 As noted above, Openreach's GEA volume offer ends in 2023, after which participating ISPs' prices are not certain. [✂].[61]

FTTP prices

2.24 The evidence from Openreach and rival network operators is that, looking forward, prices for FTTP wholesale services will be set with reference to the prevailing prices for the Openreach FTTC services (in particular the Openreach 40/10 product).

2.25 Openreach's internal documents suggest that FTTP wholesale services will [✂].[62]

2.26 Openreach's current FTTP only offer v2 is around £15 per month for 80/20 and has a £1 differential between FTTP-based 40/10 and 80/20 wholesale products.[63] This compares to a current list price differential of £3. To qualify for discounts the ISP needs to meet minimum requirements in terms of the proportion of new orders within the offer area that are FTTP, rather than FTTC or copper. We understand Openreach is planning to offer a new, longer-term deal with "at least 5 years price certainty across all speeds above the indexed anchors with the aim of encouraging take-up of higher speeds".[64]

2.27 [✂][65]. [✂].[66]

2.28 CityFibre said that "any regulation applied during this critical rollout and market expansion period that stabilises BT's regulated prices (e.g. at CPI-0%) will also stabilise our prices (albeit at a level below BT's prices)".[67]

Use of data

2.29 In recent years we have seen a move to unlimited broadband packages (i.e. with no restrictions on the volume of data used). We found that the volume of data used by broadband customers has increased in recent years (average monthly data use in 2020 was 429 GB compared to 326 GB in 2019, 241 GB in 2018, 190 GB in 2017 and 143 GB in 2016[68]). Sky estimates that data use was [✂].[69]

2.30 Market research carried out by telecoms providers suggests that data volumes will continue to increase. Research conducted by Gigaclear in 2019 indicates that internet traffic per household in the UK is [✂] from 2017 to 2022.[70]

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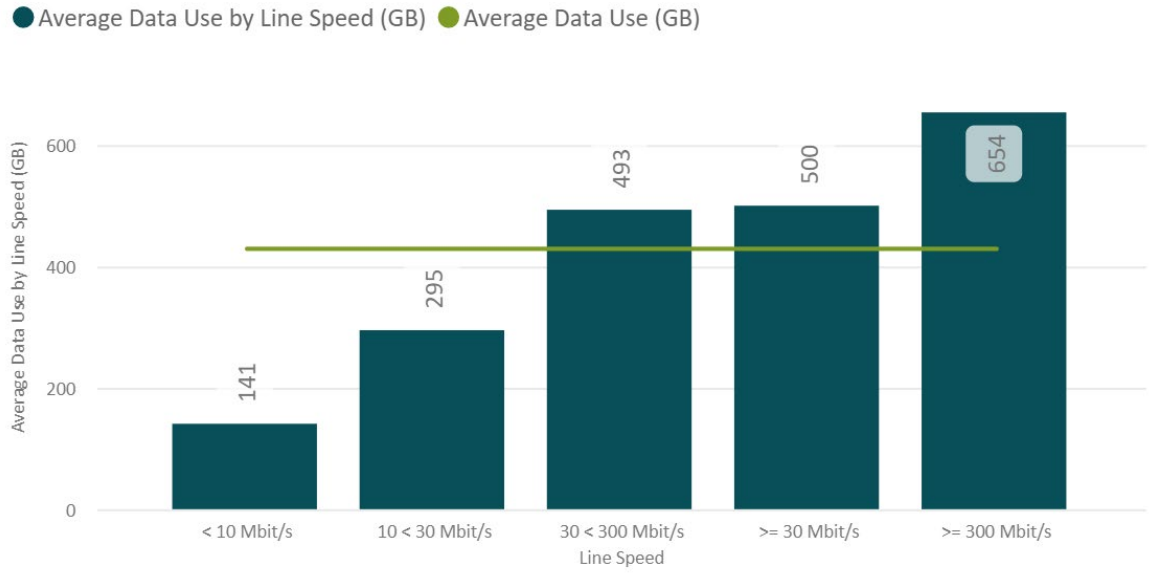
[61] [✂]
[62] Openreach assumes that the [✂]. Openreach's response dated 1 November 2019 to the s.135 notice dated 18 October 2019, [✂].
[63] Openreach's FTTP only offer v2 is available across Openreach's fibre first towns and cities FTTP footprint and provides discounts on FTTP rentals and connections. See https://www.openreach.co.uk/orpg/home/updates/briefings/ultrafastfibreaccessbriefings/ultrafastfibreaccessbriefingarticles/nga202020.do [accessed 4 March 2021].
[64] Openreach response dated 5 March to s.135 notice dated 26 February 2021, question 3.
[65] [✂] response dated [✂] to the s.135 notice dated [✂], slide 41-42.
[66] [✂] response dated [✂] to the s.135 notice dated [✂], page 4.
[67] CityFibre response to January 2020 Consultation, paragraph A1.7.
[68] For average data use figures in 2017 and 2016, see 2018 WLA Statement, Annex 5, footnote 111. 2018 and 2019 average data use figures can be found in our Connected Nations interactive reports: 2018, 2019.
[69] Sky's response dated 23 August 2019 to the s.135 notice dated 30 July 2019, [✂].
[70] Gigaclear's response dated 23 August 2019 to the s.135 notice dated 1 August 2019, [✂].

2.31 Figure 2.8 below shows average monthly data usage by broadband connection speed, as well as average monthly data use across all speeds, in 2020.[71] This shows that people subscribing to speeds above 30Mbit/s used, on average, more data than those subscribing to standard broadband.

Figure 2.8: Fixed broadband usage, average monthly data volumes by speeds, 2020 (Gigabytes)



Source: Ofcom forecast based on data from providers, Connected Nations, 17 December 2020.

Retail broadband pricing

Current advertised prices

2.32 In this subsection we look at how advertised retail prices for broadband packages have compared between ISPs and broadband speeds. Making comparisons is not straightforward for several reasons. First, as discussed above, ISPs offer a range of packages with different features. Second, ISPs might offer temporary promotions or promotions with limited availability, or other discounts and rewards.

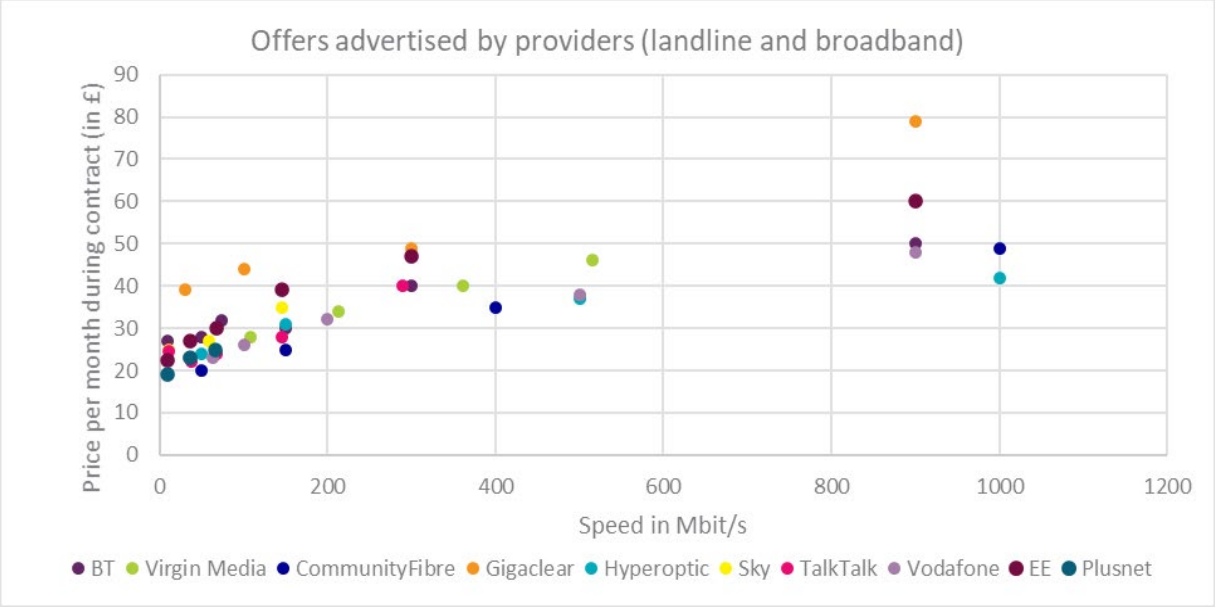
2.33 In addition, many existing customers are not paying advertised prices, and may be paying more or less than the advertised price depending on a number of factors. For example, as discussed above, some ISPs have automatically upgraded broadband speeds for large numbers of customers at no extra charge, motivated by Openreach pricing and reducing customer turnover. Also, as discussed below, our review of the prices being paid by new-contract, re-contracted and out-of-contract fixed broadband customers found that there is a wide variation in prices paid for the same broadband service.[72]

[71] Ofcom, 2020. *Connected Nations 2020: Interactive Report*.
[72] Ofcom, 2019. *Helping consumers get better deals: A review of pricing practices in fixed broadband*.

2.34 Bearing this in mind, we looked at advertised prices for dual play packages (i.e. broadband and landline) and triple play packages (broadband, landline and TV), by ISPs and broadband speed.

2.35 As noted above, ISPs offer packages differentiated on a number of dimensions. We have looked at a snapshot of retail products in the market. We have looked at how these compare between ISPs, with a particular focus on how packages offered compare on price and speeds. We note from internal documents that ISPs carry out similar exercises. Figure 2.9 provides details in relation to the range of broadband and landline products in the market as surveyed on 5 February 2021. For each product it identifies the ISP, price and broadband speeds.[73]

Figure 2.9: Advertised dual play prices and headline broadband speeds by ISP, February 2021[74]



Source: Provider websites.

2.36 This analysis shows that the largest ISPs all offer customers a choice of products offering different broadband speeds, charging a premium for packages offering higher speed.[75] Some ISPs offer more products than others and there are differences between ISPs in the range of speeds offered. It also shows that, across the market, there is not a simple relationship between price and speeds. There are several examples of higher speed products being available at prices that are the same as, or even lower than, those for products offering lower speeds.

[73] Community Fibre and Gigaclear packages do not include line rental. Prices included in this scatter plot also exclude any set-up or activation fees. Vodafone's zero differential offer between 35Mbit/s and 63Mbit/s is expected to end on 4 March 2021.
[74] Community Fibre's 3Gbit/s offer is excluded from the scatter plot as it skews the rest of the data points. It offers 3Gbit/s for £99 per month.
[75] For any given provider, offers differ primarily in terms of the broadband speed, but in some cases on the extent of additional features available such as, for example, the number of devices on which antivirus protection is available or the amount of upfront fees.

2.37 We also looked at prices for triple play packages. While not all ISPs offer triple play bundles, we found a similar relationship between price and broadband speeds. We found overlap between ISPs in the prices of packages offering different broadband speeds, albeit with fewer price points than for dual play. Advertised prices were in the range of around £22[76] to £42 for packages offering headline speeds of around 100Mbit/s or less, with a standard TV package. We also noted that some ISPs give customers the option of paying more to subscribe to access extra TV channels, and that access to premium TV packages may be limited to packages offering higher broadband speeds.

2.38 One development is that Sky has chosen to market a single FTTC-based product, rather than offering two products, one based on FTTC 40/10 and another based on FTTC 80/20.[77] Where a customer's line is capable of providing a speed above 40Mbit/s they are supplied using FTTC 80/20, otherwise they are supplied using FTTC 40/10.[78] We understand that the reason for this was for simplification prior to adding faster products to their offering. In moving to a single FTTC product, the average speed which Sky can advertise for the product reflects the average across both the FTTC 40/10- and 80/20-based services (and is, therefore, lower than the average speed Sky could advertise for a product based exclusively on FTTC 80/20 services).

Price differential between 40/10- and 80/20-based products over time

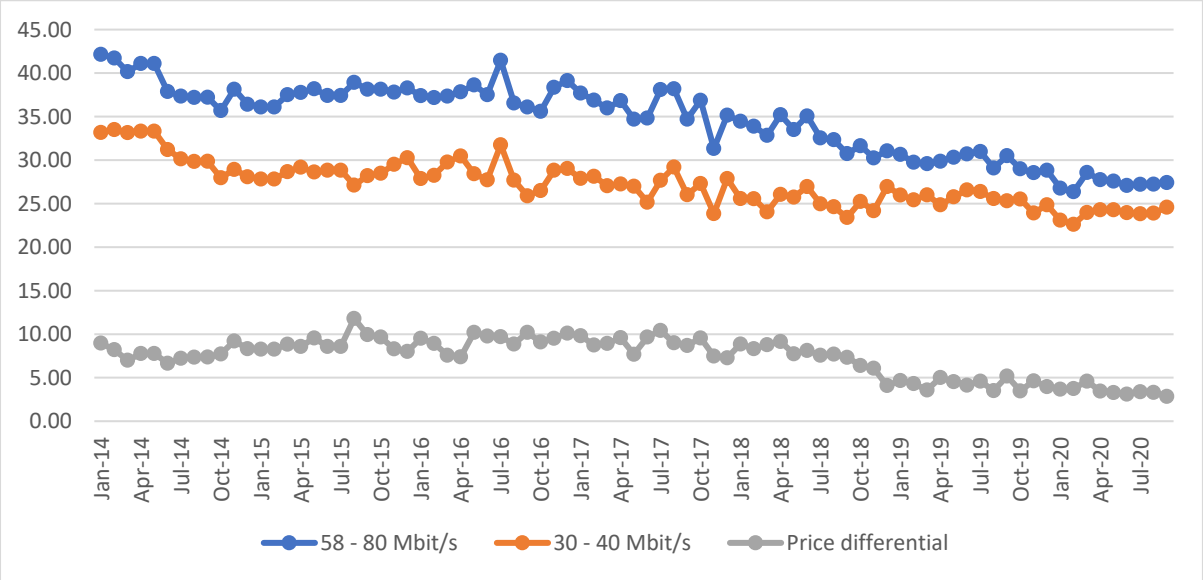
Promoted prices[79]

2.39 In this subsection we observe how the retail price differential between 40/10- and 80/20-based products has evolved over the period January 2014 to September 2020. This analysis uses data on promoted prices for dual play landline and fibre broadband bundles based on 40/10 and 80/20-based products.[80]

2.40 Figure 2.10 below shows a gradual decline in promoted retail prices over the period 2014 to 2019, and a narrowing of the differential since 2018 when Openreach's GEA discount contract was introduced.

[76] This lower end of the range is TalkTalk's 38Mbit/s triple play package which currently includes free TV. The package is usually £26.
[77] Sky, 2021. *Broadband.* https://www.sky.com/shop/broadband-talk/ [accessed 16 February 2021].
[78] Email from Sky dated 22 November 2019.
[79] Promoted prices are the average monthly charge for customers during the contract term, including the activation/connection charge for the plan, as calculated by Pure Pricing.
[80] For each ISP (including BT, Sky, TalkTalk, EE, Plusnet and Vodafone), we use the minimum price offered for a dual play broadband and landline package, within the following speed bands: 30-40Mbit/s (i.e. 40/10), and 58-80Mbit/s (i.e. 80/20). As above, the input prices used to extract the minimum price for each ISP are the average monthly charge for customers during the contract term, including the activation/connection charge for the plan, as calculated by Pure Pricing. The unweighted market average price for a particular speed band is calculated by taking an average of the ISPs' minimum prices offered for that speed band.

Figure 2.10: Promoted dual play 40/10- and 80/20-based prices over time - unweighted market average, Jan 2014 – Sept 2020



Source: Ofcom / Pure Pricing UK Broadband Updates.
Note: This data is presented in nominal terms.

2.41 In addition, as previously mentioned, Sky chose to market a single FTTC-based product from May 2019 (provided using a mixture of the 40/10 and 80/20 wholesale products), rather than offering two products (one based on FTTC 40/10 and another based on FTTC 80/20).

Actual prices

2.42 In relation to existing customers, our review of pricing practices in fixed broadband described how many customers do not pay new in-contract advertised prices. At the time of the September 2019 data collection, around 19% of customers were customers within their first contract with an ISP.[81] The majority had either re-contracted with their existing provider or were out-of-contract. The review found a wide variation in prices paid for the same broadband service. In particular, customers who do not sign a new contract with their broadband provider or switch to a new provider after the end of their minimum contract period can pay considerably more for the same service than those who do. The review also found that difficulties engaging and behavioural biases can affect the way customers make decisions and can limit their ability to choose a deal that is right for their needs. This review also found overlaps in the prices being paid (including new in-contract, re-contracted and out-of-contract) for different broadband speeds.[82]

[81] Ofcom, 2020. *Helping consumers get better deals: Review of pricing practices in fixed broadband*. Table 1. [accessed 11 March 2021].
[82] Ofcom, 2019. *Helping consumers get better deals: A review of pricing practices in fixed broadband*. paragraphs 2.21 and 3.11. [accessed 11 March 2021].

2.43 We have looked at the average actual price differential between 40/10- and 80/20-based services. In November 2018, the average differential across BT, EE, Plusnet, Sky and TalkTalk was £5.17, which declined to £4.07 in September 2019.[83, 84]

2.44 In addition, as part of our considerations of the 40/10 FTTP premium over 40/10 FTTC, we have looked at the average actual price differential between ADSL (copper) services and FTTC 40/10. In September 2019, the average differential across BT, EE, Plusnet, Sky and TalkTalk was £5.98. Additional evidence on the fibre premium can be found in Annex 19. [85]

Retail customer experience and preferences

2.45 In this subsection we set out information on consumer behaviour and preferences. This draws largely on results of surveys and other research conducted by ISPs.[86]

Factors in choice of products

2.46 Surveys undertaken for different ISPs suggest that price is the most important factor in customers' choice of broadband packages, followed by reliability and speed. A survey commissioned by Openreach found that the most important reason for switching provider is to save money, not to obtain a faster connection.[87] In particular, when those who had switched were asked about the reasons for switching, [✂]% said they had switched to save money, [✂]% said faster speeds and [✂]% said more reliable broadband. When those who said that they were likely to switch broadband providers in the future were asked why they would be likely to switch, [✂]% said to get a better price and [✂]% said to get a faster speed.[88]

[83] The market average price differentials here are calculated as follows. First, we calculate the average price differential for each provider and each contract type (new contract, re-contracted, out-of-contract) by subtracting the average 40/10-based price from the average 80/20-based price for each contract type for each provider, where prices are actual prices paid by consumers in November 2018/September 2019. Second, we calculate the market average price differential for each contract type, by weighting each provider's differential by the number of 80/20 customers on that contract type with that provider. Finally, we calculate the market average price differential across all consumers by weighting each contract type's average differential by the number of 80/20 consumers on each contract type.

[84] Sky offered a single FTTC-based product from May 2019 (with an average advertised speed of 59Mbit/s); Sky estimate that [✂]% of customers purchasing this service are supplied using the 80/20 wholesale product, and [✂]% are supplied using the 40/10 wholesale product. Therefore, customers who purchased this service between May and September 2019 were assigned to each wholesale product in these proportions.

[85] The average actual price differentials reported in paragraphs 2.43 and 2.44 are calculated using customer-level data from November 2018 and September 2019. [✂] said that it did not consider that this information is likely to be representative of the current situation ([✂]). We recognise that price differentials may change over time. Ofcom recently gathered customer-level data for September to November 2020, collected as part of the work looking to assess the impact of end-of-contract notifications (ECNs). However, this data was only received in February 2021 and has not yet been cleaned or analysed to include in this Statement.

[86] In addition to evidence received from providers in 2019, this section has been updated with new evidence, sent to us in response to the following s.135 notices: Virgin Media s.135 dated 22 July 2020; TalkTalk s.135 dated 23 July 2020; BT s.135 dated 14 August 2020; Zzoomm s.135 dated 17 August 2020; Sky s.135 dated 18 August 2020; Hyperoptic s.135 dated 19 August 2020; Openreach s.135 dated 20 August 2020; Gigaclear s.135 dated 24 August 2020; County Broadband s.135 dated 4 September 2020 and KCOM s.135 dated 18 September 2020.

[87] Openreach's response dated 12 August 2019 to the s.135 notice dated 29 July 2019, [✂].

[88] Openreach's response dated 12 August 2019 to the s.135 notice dated 29 July 2019, [✂].

2.47 BT research found that [✂].[89] [✂],[90] [✂].[91]

2.48 One [✂] study found price to be the most important factor when choosing a broadband provider, followed by reliability and speed,[92] while another found reliability to be ranked top, followed by price, then WiFi coverage/signal strength and speed.[93] A separate [✂] study found price to be the most important feature driving broadband choice among customers and non-customers when choosing between [✂].[94]

2.49 [✂] research also ranks price, reliability, brand and speed as the most important factors when consumers choose a broadband provider.[95, 96] Other research commissioned by [✂][97] found that aside from brand, price was the most important driver of choice for copper and FTTC products ([✂]%), followed by broadband speeds ([✂]%).[98]

2.50 Similar findings have also been reported by other providers in their market research.[99]

2.51 Ofcom's Switching Experience Tracker found that 41% of dual play switchers were prompted to do so by a wish to reduce their cost of services, 25% wanted faster speeds and 20% said it was due to technical issues with their previous service.[100]

2.52 Regarding the relative importance of speed and reliability, both appear important to consumers for distinct reasons. For example, [✂] found both factors to have increased in importance since 2019.[101] However, the overarching factor determining choice of broadband packages is price.

Satisfaction with broadband speeds

2.53 Table 2.11 below shows results of our research on customer satisfaction. It shows that, in winter 2020, 80% of broadband customers were satisfied with their service overall, and levels of satisfaction are in line with this across all providers in this sector. Nearly four in five broadband customers are satisfied with the reliability of their service and again there are no statistically significant differences by provider on this measure. TalkTalk customers are less satisfied with the speed of their broadband service, compared to the average.[102]

[89] BT's response dated 4 November 2019 to the s.135 notice dated 21 October 2019, [✂].
[90] BT's response dated 4 November 2019 to the s.135 notice dated 21 October 2019, [✂].
[91] BT's response dated 4 November 2019 to the s.135 notice dated 21 October 2019 [✂].
[92] [✂] response dated [✂] to s.135 notice dated [✂], [✂].
[93] [✂] response dated [✂] to s.135 notice dated [✂], [✂].
[94] [✂] response dated [✂] to s.135 notice dated [✂], [✂].
[95] [✂] response dated [✂] to s.135 notice dated [✂], [✂].
[96] [✂] response dated [✂] to s.135 notice dated [✂], [✂].
[97] [✂] response dated [✂] to s.135 notice dated [✂], [✂].
[98] Ibid - and then [✂].
[99] [✂] response dated [✂] to s.135 notice dated [✂], [✂] and [✂] response dated [✂] to s.135 notice dated [✂], [✂].
[100] Ofcom, Switching Experience Tracker March/April 2020 and September/October 2020. [accessed 11 March 2021].
[101] [✂] response dated [✂] to s.135 notice dated [✂], [✂].
[102] Given a change in methodology, from predominantly face-to-face to online only, year-on-year comparisons with previous customer satisfaction tracker data cannot be drawn.

Table 2.11: Satisfaction with fixed broadband service among residential customers

	Average	BT	EE	Plusnet	Sky	TalkTalk	Virgin Media
Satisfaction with overall service	**80%**	80%	82%	81%	80%	77%	80%
Satisfaction with reliability of service	**78%**	81%	80%	79%	80%	76%	77%
Satisfaction with speed of service	**79%**	80%	78%	75%	80%	**71%**	82%

Source: Ofcom Customer Satisfaction Tracker, Winter 2020.

2.54 Research conducted for [✂] found levels of satisfaction with current broadband speeds to be in the range of [✂]% depending on the ISP.[103]

2.55 Research commissioned by [✂] found that [✂]% of broadband consumers think they will never need access to faster broadband speeds.[104] [✂] research found that customers receiving 50-80Mbit/s (from technologies such as FTTC which provides speeds up to 80Mbit/s) have low levels of take-up of faster speeds, suggesting that there may be good levels of satisfaction with speeds offered by FTTC based services,[105] while research for [✂] found that most of the market is happy with "standard fibre speeds"[106] and "[✂] desire ultrafast".[107, 108] Meanwhile, [✂] research identified a "clear correlation" between speeds and customer satisfaction.[109]

2.56 Research conducted by ISPs suggest higher levels of dissatisfaction among 'copper' customers (we understand this to be referring to those taking standard ADSL broadband with speeds of up to 17Mbit/s).

2.57 Sky reports that [✂]% of copper customers are "interested" in upgrading, and that [✂]% of Sky copper customers report they "don't need faster speeds" as the reason that best describes why they do not currently have fibre broadband.[110] An Openreach survey found that among copper customers, [✂]% were likely to upgrade to faster services. Of those who intend to upgrade, [✂]% gave "I'd like to have faster broadband speeds" as one of the reasons.[111]

2.58 Recent research suggests that the first Covid-19 lockdown did not have a major impact on customer preferences. For example, [✂] research found that the perception of most

[103] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[104] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[105] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[106] i.e. [✂].
[107] [✂].
[108] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[109] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[110] Sky's response dated 23 August 2019 to the s.135 notice dated 30 July 2019, [✂].
[111] Openreach's response dated 12 August 2019 to the s.135 notice dated 29 July 2019, [✂].

respondents of their broadband service was unchanged [✂] by Covid-19.[112, 113] [✂] research found that, among those working from home, for most [✂] their broadband speeds and reliability had been sufficient.[114]

2.59 In addition, Uswitch research found that there had been a 29% increase in household internet use during the first lockdown, and around one fifth of households were reporting issues that they don't usually suffer.[115] However, [✂] research reported the [✂] as finding the network to be holding up well in [✂].[116]

2.60 Our UK home broadband performance study from May 2020 also found that networks generally coped well with the increase in traffic with download and upload speeds falling only by 2% and 1% respectively between the first and last weeks of March 2020.[117] Frontier said that this reflects the fact that broadband providers scale their networks to handle capacity requirements at peak times, and that "the bandwidth offered by existing networks – in particular, Openreach's superfast copper-based FTTC network – has been sufficient to meet the requirements of consumers during lockdown and that there could also be sufficient 'headroom' in the FTTC network to absorb any longer-term/sustained shifts in usage resulting from the crisis".[118]

Drivers of take-up of higher speed broadband services

2.61 The evidence suggests that both demand and supply-side factors will drive take-up of higher speed broadband services over the review period.

2.62 On the demand side, we have been told that the main drivers of residential demand for higher speeds have been an increase in the use of video-on-demand and gaming, and the simultaneous use of multiple devices in the home. Virgin Media research conducted in May 2020 found the drivers, besides value, to be quick access to content and concurrency.[119, 120] Openreach research finds that the proportion of consumers streaming video-on-demand services at home has significantly increased from [✂]% in 2017 to [✂]% in 2019.[121] Uswitch estimate that the average household has eight connected gadgets, with up to five devices being on at the same time.[122] Research commissioned by Gigaclear in 2019 expected online video and gaming traffic to grow at [✂] from 2017 to 2022, respectively,

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[112] [✂] and [✂] had a better and worse perception, respectively, of their broadband service in October 2020 compared to pre-Covid.
[113] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[114] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[115] USwitch, 2020. *Uswitch, Locked-down households using internet for 41 hours a week – Southampton sees biggest surge, 4 May 2020*. [accessed 10 March 2021].
[116] [✂] response dated [✂] to the s.135 notice dated [✂].
[117] Ofcom, 2020. *Broadband networks stand firm during pandemic*. [accessed 10 March 2021].
[118] Vodafone response to July 2020 consultation. Vodafone, 2020. *Pricing Wholesale Local Access Services*. section 5.6.1. [accessed 10 March 2021].
[119] Concurrency refers to doing 'lots of things online at once' and that 'everyone in the household could be online at the same time'.
[120] Virgin Media response dated 8 September 2020 to s.135 notice dated 22 July 2020, [✂].
[121] Openreach's response dated 12 August 2019 to the s.135 notice dated 29 July 2019, [✂].
[122] Uswitch, *Locked-down households using internet for 41 hours a week – Southampton sees biggest surge*, 4 May 2020.

and that gaming traffic would account for [✂]% of total IP traffic by 2022, up from [✂]% in 2017.[123]

2.63 Research conducted for Openreach, dated from May 2019, also found that [✂]% of all customers were "extremely likely" to upgrade to 1Gbit/s broadband driven by the use of broadband for work purposes. Further, it found males, younger consumers in the 18-34 age group, to be the key groups likely to upgrade to 1Gbit/s ultrafast broadband. This research found that upgrading might be driven by pull factors (e.g. liking the idea of faster broadband) as well as push factors (e.g. being unhappy with their current connection).[124]

2.64 On the supply side, internal documents suggest that ISPs are exploring various approaches to attracting more customers, and then 'moving customers up the ladder'. For example:

- BT has considered the options for the design of packages including [✂]. BT [✂].[125]
- Vodafone has used a [✂][126], [✂][127], [✂][128], [✂].[129]
- Virgin Media has been rolling out 1Gbit/s broadband speeds across 2020[130] [✂].[131] Virgin Media [✂].[132] [✂].[133]

2.65 Gigaclear has a current price differential of £5 between its 30Mbit/s, 100Mbit/s, and 300Mbit/s products.[134]

Willingness to pay for faster services

2.66 Evidence from ISPs suggest low willingness to pay for faster broadband speeds. Several factors were identified as contributing to this, including: high levels of satisfaction with current speeds, that many people do not currently need higher broadband speeds or want to pay more for them and, more generally, a lack of awareness of their existing speeds and experience of the benefits of higher speeds.

2.67 BT research found that the most important reasons for not upgrading to ultrafast are satisfaction with current speed and the price of faster internet.[135] This is supported by research commissioned by other ISPs.[136]

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[123] Gigaclear's response dated 23 August 2019 to the s.135 notice dated 1 August 2019, [✂].
[124] Openreach's response dated 12 August 2019 to the s.135 notice dated 29 July 2019, [✂].
[125] BT's response dated 4 November 2019 to the s.135 notice dated 21 October 2019, [✂]; BT's response dated 11 September 2020 to the s.135 notice dated 14 August 2020, [✂].
[126] Vodafone's response dated 9 August 2019 to the s.135 notice dated 12 July 2019, [✂].
[127] Vodafone's response dated 9 August 2019 to the s.135 notice dated 12 July 2019, [✂].
[128] Vodafone's response dated 9 August 2018 to the s.135 notice dated 12 July 2019, [✂].
[129] Vodafone's response dated 9 August 2018 to the s.135 notice dated 12 July 2019, [✂].
[130] Virgin Media's response dated 8 September 2020 to the s.135 notice dated 22 July 2020, [✂].
[131] Virgin Media's response dated 30 August 2019 to s.135 notice dated 12 July 2019, [✂].
[132] Virgin Media's response dated 8 September 2020 to the s.135 notice dated 22 July 2020, [✂].
[133] Virgin Media's response dated 8 September 2020 to the s.135 notice dated 22 July 2020, [✂].
[134] Gigaclear, 2021. *Home broadband*. [accessed 10 March 2021].It also offers a 900Mbit/s product at a £30 premium to 300Mbit/s.
[135] Ofcom/ BT Consumer meeting, 25 September 2019, [✂].
[136] [✂] response dated [✂] to the s.135 notice dated [✂], [✂]; [✂] response dated [✂] to the s.135 notice dated [✂], [✂]; [✂] response dated [✂] to the s.135 notice dated [✂], [✂].

2.68 Openreach research asked "copper" customers (see above) whether they would be likely to upgrade to faster services, where available.[137] Results suggest that around [✂]% of these customers said that they would be unlikely to upgrade and of these:

- around three quarters "don't use broadband for work purposes" and a third "don't stream TV content"[138]; and
- [✂]% or more "don't want to spend more money on broadband", "are happy with their current speed" and/or "didn't think they need superfast broadband".[139]

2.69 Sky told us that although customers expect faster speeds, they are not willing to pay more for them. Sky consider that "willingness to pay is decreasing as the market becomes more competitive".[140] Research conducted for Sky found that among Sky standard broadband customers, [✂]% gave "I don't want to pay the higher price" and [✂]% gave "I don't need faster speeds" as the reason for not having faster broadband.[141]

2.70 More recent [✂] research from August 2019 found that [✂]% of [✂]Mbit/s consumers are unwilling to pay slightly more for much faster speeds or better reliability, and [✂]% of [✂]Mbit/s consumers are unwilling to pay slightly more for much faster speeds or better reliability.[142]

2.71 Research commissioned by [✂] suggested that some people are willing to pay a premium for higher speed products. The study above found that customers subscribing to [✂] are the most willing to pay a little more money for higher speeds or better reliability.[143] Other research found that [✂] and that consumers currently with [✂] services have a substantially higher additional willingness to pay for 1Gbit/s broadband than those with lower bandwidths.[144]

2.72 In response to our January 2020 Consultation, Sky told us that current broadband services are adequate and there is a low willingness to pay for faster speeds. It indicates that long-term affordable FTTP prices are necessary to ensure large volumes of consumers migrate to new networks quickly. However, Sky also say that "while consumers exhibit a low willingness to pay more for higher speeds, they also exhibit fairly high loss aversion".[145]

2.73 Virgin Media research found that [✂]% of existing Virgin customers would be willing to pay a premium for faster download speeds.[146] Virgin believes that there is a potential to

[137] Openreach response dated 12 August 2019 to the s.135 notice dated 29 July 2019, [✂].
[138] These proportions for copper customers who claimed they would not upgrade to fibre broadband were significantly higher than those for the entire sample.
[139] Openreach response dated 12 August 2019 to the s.135 notice dated 29 July 2019, [✂].
[140] Sky response dated 23 August 2019 to the s.135 notice dated 30 July 2019, [✂].
[141] Sky response dated 23 August 2019 to the s.135 notice dated 30 July 2019, [✂].
[142] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[143] Ibid.
[144] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[145] Sky response to January 2020 Consultation. Sky, 2020. *Wholesale Fixed Telecoms Market Review: Response to Ofcom's consultation*. Page 6-7, 13. [accessed 10 March 2021].
[146] Virgin Media's response dated 30 August 2019 to the s.135 notice dated 12 July 2019, [✂].

monetise faster speeds of 1Gbit/s in areas with more network capacity and consumer demand.[147]

2.74 Research suggests that the majority of customers remain price sensitive. Relevant evidence includes:

- [✂] research found that [✂]% of a nationally representative sample would not be prepared to pay more than [✂]per month for 1Gbit/s and [✂] would not be prepared to pay more than [✂] per month for 1Gbit/s.[148]
- Research commissioned by [✂] found that paying [✂] per month for 150Mbit/s feels high among those customers currently paying at least [✂] per month for more than 50Mbit/s.[149]
- [✂] research found that [✂] of respondents said they would consider switching to a higher speed if it meant paying more, and around [✂] was the average price deemed too expensive for 100Mbit/s, with small increments moving up the speed ladder.[150]
- [✂] analysis also found low incremental willingness to pay for speeds beyond 80Mbit/s, with an average willingness to pay [✂] per month to switch from 80Mbit/s to 220Mbit/s, [✂] to switch from 80Mbit/s to 500Mbit/s, and [✂] to switch from 80Mbit/s to 1Gbit/s.[151]
- A survey commissioned by Gigaclear (of people in current and planned Gigaclear areas who had heard of "full fibre") found that over [✂]% of respondents would not be willing to pay more for full fibre, although the report indicates that [✂].[152]

2.75 Research commissioned by [✂][153] and [✂].[154] More recent research commissioned by [✂] found that [✂]% of non-FTTP customers were either unaware of FTTP or had only heard the name,[155] while [✂] found low awareness of FTTP with [✂] being unaware of the term FTTP.[156] In addition, recent [✂] evidence found that [✂]% of UK consumers don't know what the speed of their broadband service is.[157]

2.76 UBS' most recent annual survey (dated August 2020) on European telecoms usage (drawing on responses from 10,000 consumers) found that 36% of UK consumers are willing to pay a premium for 200Mbit/s, while 48% are not. 38% of UK consumers are willing to pay a premium for 1Gbit/s, while 47% are not.[158, 159]

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[147] Virgin Media's response dated 30 August 2019 to the s.135 notice dated 12 July 2019, [✂].
[148] [✂] response dated [✂] to the s.135 dated [✂], [✂].
[149] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[150] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[151] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[152] Gigaclear response dated 23 August 2019 to the s.135 notice dated 1 August 2019, [✂].
[153] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[154] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[155] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[156] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[157] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[158] Regarding willingness to pay a premium for 200Mbit/s, 20% would pay over €2.50, 9% would pay €5, 4% would pay €7.50 and 3% would pay €10. Regarding willingness to pay a premium for 1Gbit/s, 11% would pay over €2.50, 13% would pay €5, 8% would pay €7.50 and 6% would pay €10.
[159] UBS Evidence Lab, 6th wave of annual European Usage of Telecoms survey, report dated January 2021.

Willingness to downgrade to slower speeds

2.77 Some recent research by [✂] suggests that consumers would downgrade to a slower service in response to increases in price differentials between their existing package and a slower speed package. Specifically, it found [✂].[160]

Wireless services

2.78 Broadband services could be provided to fixed locations using wireless services. We discuss the three main ways to do this below.

Satellite

2.79 Traditionally, satellite services have been offered using geostationary (GEO) satellites. GEO satellites are positioned a significant distance from the Earth, leading to lower speeds and larger response times. A new generation of satellites in low earth orbit (LEO) are being deployed. This could offer a better quality of service. GEO and LEO satellite services are explained in more detail in Annex 2.

2.80 Services provided on GEO satellites have been traditionally used to provide commercial broadband connections of 2-30Mbit/s.[161] The available subscription packages cost around £40 and have data caps of 30-50 GB per month. This data cap is much lower than the typical usage of a fixed broadband connection. Typically, satellite broadband involves large upfront charges for equipment, which can be up to £400-£600.[162]

Mobile

2.81 Customers could also use mobile networks to provide their broadband services. However, as with satellite broadband, usage allowances in this case may be restrictive for the majority of customers. As consumers now use, on average, around 430 GB per month on a fixed connection,[163] Table 2.12 below suggests that data caps are low compared to the average user's needs. However, mobile network operators (MNOs) have started to lift restrictions on data usage for some packages. For example, Vodafone, O2 and Three all offer 5G ready unlimited plans, and EE also offers a 5G ready, unlimited 24-month data package.

[160] [✂] response dated [✂] to the s.135 notice dated [✂], [✂].
[161] Compare the market.com, 2021. Satellite broadband [accessed 12 January 2021].
[162] Freedomsat, 2021. Satellite broadband for the home [accessed 12 January 2021].
[163] See Figure 2.8 above.

Table 2.12: Illustrative examples of 5G/5G ready mobile packages provided by EE, O2, Three and Vodafone, 18 December 2020, by contract duration[164, 165]

Contract length	30 days		12 months	
MNO	Data	Price	Data	Price
EE	N/A	N/A	20 GB	£22
			40 GB	£25
O2	15 GB	£23	10 GB	£17
	25 GB	£27	250 GB	£25
	50 GB	£37	Unlimited	£35
Three	12 GB	£19	12 GB	£8
	30 GB	£24	30 GB	£15
	Unlimited	£26	Unlimited	£20
Vodafone	20 GB	£33	20 GB	£21
	Unlimited	£45	Unlimited	£33

Sources: https://shop.ee.co.uk/sim-only/pay-monthly-phones, https://www.o2.co.uk/shop/sim-cards/sim-only-deals#deviceType=phone&contractLength=P12M, http://www.three.co.uk/Store/SIM/Plans_for_phones, https://www.vodafone.co.uk/mobile/best-sim-only-deals [accessed 18 December 2020].

2.82 Mobile coverage is evolving and 5G has the potential to offer higher speeds than 4G (see Annex 2). However, while 91% of the UK has good 4G coverage from at least one operator, 5G is not as widespread yet.[166] 5G has been launched by all four main MNOs in 2019. The 5G footprint is being expanded, but it currently has limited reach, with operators making it first available in select areas of the biggest cities in the UK.[167]

Fixed wireless

2.83 Fixed wireless access (FWA) technology can be used in numerous ways:[168]

- by fixed wireless operators using unlicensed/lightly-licensed spectrum and fixed access services for backhaul;
- by mobile network operators using their 4G/5G spectrum to connect from cell sites to the premises; or,
- by fixed networks to connect from a nearby distribution point to the premises (i.e. wireless lead-ins).

[164] The information reported in this table relates to 5G or 5G ready packages with 30 day and 12-month contract lengths. Also, where relevant, we selected the basic version of the relevant 5G ready package. We note that packages offering different contract lengths, data allowances and other features may be available.
[165] A 5G ready package enables the consumer to use the 5G network as soon as it becomes available in their area.
[166] Ofcom, 2020. *Connected Nations 2020: Interactive report*, page 12.
[167] Ofcom, 2019. *Latest UK broadband and mobile coverage revealed*.
[168] See Annex 2 for a description of these uses of FWA technology.

2.84 MNOs (EE, Three and Vodafone) offer home broadband services using their mobile networks, using 4G and, more recently, 5G. These services share many of the characteristics of mobile broadband but are optimised for home usage. On a 4G network, download speeds are currently around 30Mbit/s on average, and on a 5G network, which currently has limited coverage, around 150Mbit/s.[169] Table 2.13 gives details of products available and prices, including upfront fees where applicable.

2.85 The prices for these services are similar to those for fixed broadband products offering speeds above 300Mbit/s.[170] However, for many there are up-front fees,[171] caps on data volumes, availability (i.e. coverage) is limited to certain areas, and speeds may vary depending on location. These factors, together with pricing, have resulted in relatively low take up of fixed wireless on 4G/5G so far.

Table 2.13: 4G/5G Home broadband packages provided by EE, Three and Vodafone, 18 December 2020

MNO	Data	Price /month	Contract length	Upfront fee
EE 4GEE Router	100 GB	£35	18 months or 1 month	£0 or £100
	200 GB	£40		
	300 GB	£45		
	500 GB	£50		
	Unlimited	£55		
Three HomeFi 4G broadband	Unlimited	£30	1 month	£49
		£25	12 months	£19
		£22	24 months	£0
Vodafone 5G Gigacube	100 GB	£30	18 months	£100
	200 GB	£40	or 30 days with £325 upfront fee	£50
	Unlimited	£60		£50
Vodafone 4G Gigacube	100 GB	£30	18 months	£0
	200 GB	£40	or 30 days with £100 upfront fee	£0
	300 GB	£50		£0

[169] Ofcom, 2020. Connected Nations 2020 UK Report.
[170] For example, EE's 4G Home broadband prices range between £35 and £55 (depending on data allowance), and its fixed broadband prices are £47 for 300 Mbit/s and £60 for 900 Mbit/s [Source: https://shop.ee.co.uk/broadband, accessed 5 February 2021].
[171] The upfront fees for these services tend to be larger than fixed broadband connection fees i.e. the upfront fees listed here for 4/5G home broadband packages are c.£33 as a simple average (but can range from £0 to £100). Fixed broadband connection fees are c.£24 as a simple average (but can range from £0 to £35). Source: provider websites.

Source: https://shop.ee.co.uk/dongles/pay-monthly-mobile-broadband/4gee-router/details#; http://www.three.co.uk/store/broadband/home-broadband; https://www.vodafone.co.uk/gigacube/ [accessed 18 December 2020].

2.86 Stakeholders have provided views on the potential of 5G FWA as an alternative to fixed (wired) broadband. Fixed network operators tend to be of the view that 5G FWA is unlikely to be a service that could be supplied to sufficiently large numbers of customers to generally compete with fixed services.

2.87 While mobile network operators tend to support this view in the longer term, they identified that 5G FWA could be used in the shorter term while their 5G networks are less heavily loaded with mobile traffic and could continue to support customers without access to fibre networks (such as rural locations) or in locations where mobile coverage is particularly good. They also considered they could be a viable alternative for consumers with lower bandwidth requirements.

2.88 One area where both fixed and mobile operators noted 5G FWA could have a role was in providing the final connection (i.e. using FWA as a replacement for a fixed lead-in). This approach would still require, as with a fixed lead-in, high speed fixed network infrastructure to be available close to the end-users' sites.

Leased lines

2.89 Leased lines provide users with high quality business connectivity services between two or more locations. These services tend to be symmetric (the capacity is the same in both directions) and uncontended (the capacity is guaranteed and not subject to reduction by the presence of other telecoms services). Leased lines are significantly more expensive than broadband services.[172]

Uses

2.90 Leased lines are typically used to provide:

- connectivity between business sites;
- business connectivity to virtual private networks (VPNs), the internet and cloud computing;
- mobile network connectivity (often referred to as mobile backhaul) which provides connectivity from mobile cell sites (antennae) to the MNO's network; and
- broadband network connectivity (often referred to as 'fixed broadband backhaul' or 'local loop unbundling (LLU) backhaul') which provides connectivity from broadband providers' equipment located in BT exchanges back to the operators' own networks.

[172] For example, we looked at advertised prices for BT products aimed at SME customers as at 3 February 2021. We found advertised prices for broadband-based products offering download speeds of 76Mbit/s to range from £29.95 to £72.45 a month. This compared with advertised price for a leased line offering speeds of 50Mbit/s from £195 a month and 100Mbit/s from £340 a month.

2.91 Annex 2 provides further information on these different uses of leased lines, with a more general illustration showing the components used to provide an end-to-end service shown in Figure 2.14 (see below).

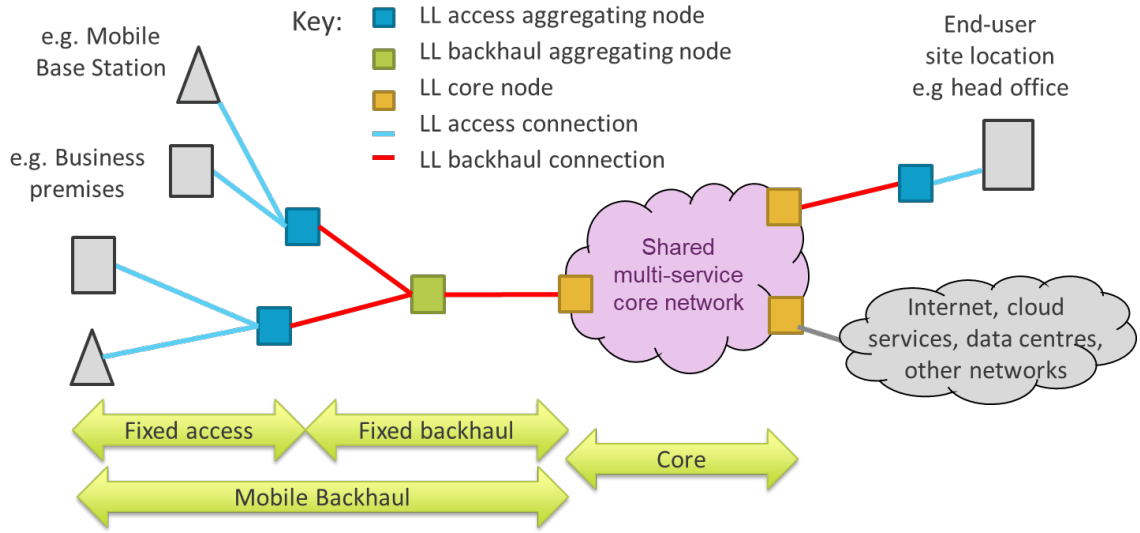
2.92 We explain the end-to-end leased line supply chain in more detail later in this section.

Products

2.93 Leased lines generally use optical fibres to make the physical connection between two points. The two main types of technology used to deliver leased line products are Ethernet and wavelength division multiplex (WDM). Leased lines are typically provided with the equipment, such as Ethernet and WDM, provided by the supplier, or as a dark fibre connection with the equipment to create an end-to-end service provided by the customer.

2.94 We provide a short overview of Ethernet, WDM, and dark fibre below.

Figure 2.14: An illustration of the components used to provide an end-to-end leased line service



Source: Ofcom.

Ethernet

2.95 The widespread use of Ethernet services and the availability of Ethernet equipment means that Ethernet is the preferred technology for the majority of installed leased line circuits in the UK. Point-to-point leased lines are generally based on Ethernet standards[173] and are specified by bandwidth (e.g. 100Mbit/s, 1Gbit/s or 10Gbit/s).[174] Ethernet leased lines are typically delivered over fibre and changing the bandwidth involves changing, or reconfiguring, the electronics at both ends. For example, Openreach provides leased line

[173] Ethernet as a technology is described by a set of standards (e.g. 802.3) organised by the Institute of Electrical and Electronics Engineers (IEEE). More information can be found at the IEEE website http://standards.ieee.org/index.html [accessed 26 February 2021]. These standards cover many things including: how the data is structured, the transmission medium used (copper, fibre, wireless), and the bandwidth speeds (e.g. 100Mbit/s, 1Gbit/s, 10Gbit/s).

[174] 100Mbit/s Ethernet services can also support legacy 10Mbit/s speeds, using a feature known as '10/100 autosensing'.

Ethernet services using its range of EAD (Ethernet Access Direct) products with speeds of up to 10Gbit/s.

Wavelength division multiplex (WDM)

2.96 WDM is also a fibre-based technology with features suited for high capacity routes (e.g. between core nodes and to data centres) and for higher capacity backhaul connections. WDM is a technology that uses different wavelengths (colours) of light to create separate virtual circuits over the same fibre, or pairs of fibre. WDM circuits generally require electronics and optical lasers built to a higher specification than lower speed circuits.

2.97 WDM is particularly attractive where demand is expected to grow over time, as extra capacity can be provided quickly without the need to add more fibres. Once the first circuit is installed, additional circuits can be added simply by adding or lighting an extra wavelength. WDM also offers more flexibility for customers by supporting data transmission technologies other than Ethernet.[175] Different transmission technologies can run over different wavelengths on a single fibre. WDM supports network sharing by allowing different wavelengths to be allocated to different end users.

2.98 WDM systems can provide capacity from 10Gbit/s to as much as 400Gbit/s. For example, Openreach offers a WDM product called OSA (optical spectrum access) Filter Connect, which comes with a pre-provided 10Gbit/s Ethernet service and the option to grow capacity using additional wavelengths and using Ethernet or other transmission technologies as described above.

Dark fibre

2.99 Dark fibre providers install and sell fibre to connect between two sites, with the purchaser of the dark fibre adding the active electronics to provide services such as Ethernet or WDM. Dark fibre is, therefore, particularly attractive to wholesale customers (for example, MNOs), but also potentially to some end customers who can manage the provision of the electronics. Since the electronic equipment is provided by the customer, rather than the fibre provider, it allows greater choice in how services are provided over the fibre than being limited to just Ethernet or WDM services.

Other technologies

2.100 Ethernet over broadband can be used to emulate lower speed, point-to-point leased line connections. However, this technology shares capacity among multiple users, rather than providing a dedicated point-to-point service. Ethernet over broadband is an asymmetric service, meaning speeds are generally limited by the upstream capability of the technology. For example, a shared fibre GPON service can provide a 100-300Mbit/s

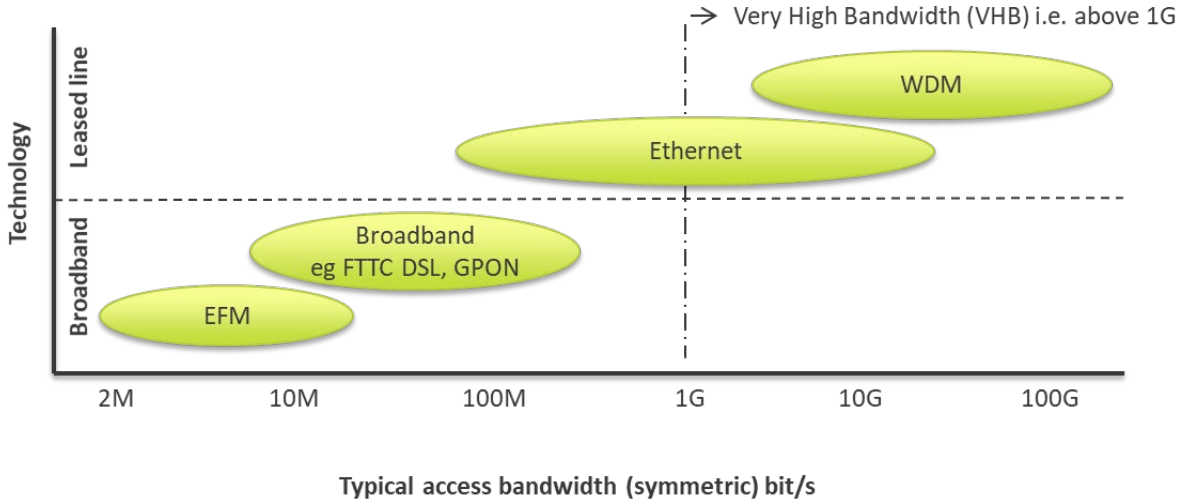
[175] WDM can support a wide range of data transmission technologies including Ethernet, Fibrechannel, and legacy technologies such as SDH (e.g. Cisco, 2000. *Introduction to DWDM technology* [last accessed 28 January 2021]).

symmetric-like service,[176] with 'burstable' download and upload speeds of, typically, 1Gbit/s.

2.101 Ethernet in the first mile (EFM) is a copper-based technology, offering speeds typically in the range of 20-30Mbit/s. EFM relies on access to BT's copper access network (via the local loop unbundling remedy), which is available at all BT exchanges. However, the availability of EFM is typically limited to larger exchanges where business site density is higher. EFM is not suitable for backhaul or core connections. These services are being superseded by Ethernet over broadband.

2.102 A stylised picture summarising the different range of speeds by technology is shown in Figure 2.15.

Figure 2.15: Stylised summary of business connectivity services by bandwidth[177] and technology



Source: Ofcom.

2.103 The total volume of Ethernet and WDM circuits has been increasing and is forecast to continue to do so. The use of dark fibre, instead of active variants, is also expected to grow over the review period. We expect, however, that the use of EFM will decline as demand for higher speed services increases.[178] We discuss this further below.

Replacement by FTTP

2.104 Information provided by various network operators suggests that some businesses will replace lower bandwidth Ethernet and other leased line technologies with FTTP-based products, as fibre networks expand. For instance:

[176] For a PON, the upstream shared capacity is determined by the number of users connected to the PON which can typically be between 8 and 32 - depending on the PON design - and the number of users active at any one time.
[177] For broadband, the diagram uses the upstream speed as a proxy for the maximum symmetric speed available e.g. a 20Mbit/s upstream, 80Mbit/s downstream product could be used as the basis for a 20Mbit/s symmetric product.
[178] Ofcom internal analysis of various operators' responses to the s.135 information requests on leased lines forecasts and plans.

a) [✂] told us that it [✂] expects enterprise customers using lower speed leased line services to migrate to business FTTP products where these become available.[179]

b) [✂] told us that [✂].[180]

c) [✂] told us that [✂] FTTP, which it expects will increasingly replace Ethernet services.[181]

d) Gigaclear told us that its network offers FTTP to SME and small and medium-sized business (SMB) customers since the resilience, bandwidth capacity and upload speeds available enable FTTP to be a substitute for some leased line services. However, business FTTP cannot meet all the needs of larger businesses.[182]

Volumes

Volumes by user type

2.105 There are a variety of leased line users, ranging from those that use a single leased line at a lower speed to those using multiple high-speed links across the UK. Volume data submitted by stakeholders suggests that overall MNOs purchase more leased lines than enterprise or public sector customers. MNOs also purchase more very high bandwidth (VHB) circuits (i.e. circuits with a bandwidth over 1Gbit/s) than other types of customer.[183] MNO's demand for VHB circuits is expected to increase over the review period, although this may peak in 2023 and remain more or less constant for the remainder of the period.[184] Enterprise customers also account for a substantial proportion of VHB volumes and are using increasing volumes of circuits at speeds faster than 1Gbit/s.[185] We discuss MNOs as consumers of leased lines further below.

2.106 All networks are expecting the total volumes of leased line and dark fibre connections to grow over the review period, reflecting a steady increase in demand for leased lines and dark fibre products from enterprise and public sector customers. Based on the data available, demand for leased line and dark fibre connections from MNOs is also expected to increase, although this may peak in 2023 and remain more or less constant for the remainder of the period.[186]

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[179] [✂] response dated [✂] to the s.135 notice dated [✂], question 3.
[180] [✂] response dated [✂] to the s.135 notice dated [✂], question 3.
[181] [✂] response dated [✂] to the s.135 notice dated [✂], question 2.
[182] Gigaclear response to January 2020 Consultation, paragraphs 39-42.
[183] [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4 and [✂] response dated [✂] to the s.135 notice dated [✂], question 4.
[184] [✂] response dated [✂] to the s.135 notice dated [✂], question 1b.
[185] [✂] response dated [✂] to the s.135 notice dated [✂], question 1b.
[186] [✂] response dated [✂] to the s.135 notice dated [✂], question 2s.

Volumes by speed

2.107 In recent years demand for low bandwidth leased line connections has declined as the demand for higher bandwidth requirements has increased.[187] Currently, for wholesale Ethernet services, BT prices 10Mbit/s almost identically to 100Mbit/s services, and provides it using the same equipment as a 100Mbit/s service.[188] VHB circuits currently make up a relatively small proportion of leased lines compared to circuits at 1Gbit/s and below, but forecasts indicate the use of VHB services will increase over the next five years:[189]

- [✂] expects demand for higher capacity products to increase as businesses become less willing to compromise on how their critical services are delivered.[190] It forecasts that higher bandwidth requirements and [✂] will see customers increasingly switch to 1Gbit/s connections.[191]
- [✂] told us that it expects business's demand for VHB products to increase [✂] year on year, with the number of installed circuits estimated to [✂].[192] [✂] told us it expects that most of this increase will come from upgrades, rather than new connections.[193]
- [✂] expects MNOs' demand for VHB circuits to [✂] and projects that [✂].[194]
- [✂] likewise expects business demand for higher bandwidth services to increase sharply, and that many sites requiring circuits at 1Gbit/s today are likely to transition to VHB circuits (or dark fibre) in future. [✂] estimates that the share of 1Gbit/s and over 1Gbit/s services will increase [✂].[195]
- Recent market research carried out for [✂,] predicts that [✂].[196]
- [✂] forecasts that some large businesses may request speeds as high as 100Gbit/s.[197]

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[187] [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4 and [✂] response dated [✂] to the s.135 notice dated [✂], question 4.

[188] The electronics for 10Mbit/s and 100Mbit/s are the same, using 'autosensing' to select the correct transmission speed.

[189] [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4 and [✂] response dated [✂] to the s.135 notice dated [✂], question 4.

[190] [✂] response dated [✂] to the s.135 notice dated [✂], question 3.

[191] [✂] response dated [✂] to the s.135 notice dated [✂], question 3.

[192] [✂] response dated [✂] to the s.135 notice dated [✂], question 1.

[193] [✂] response dated [✂] to the s.135 notice dated [✂], question 1.

[194] [✂] response dated [✂] to the s.135 notice dated [✂], question 1.

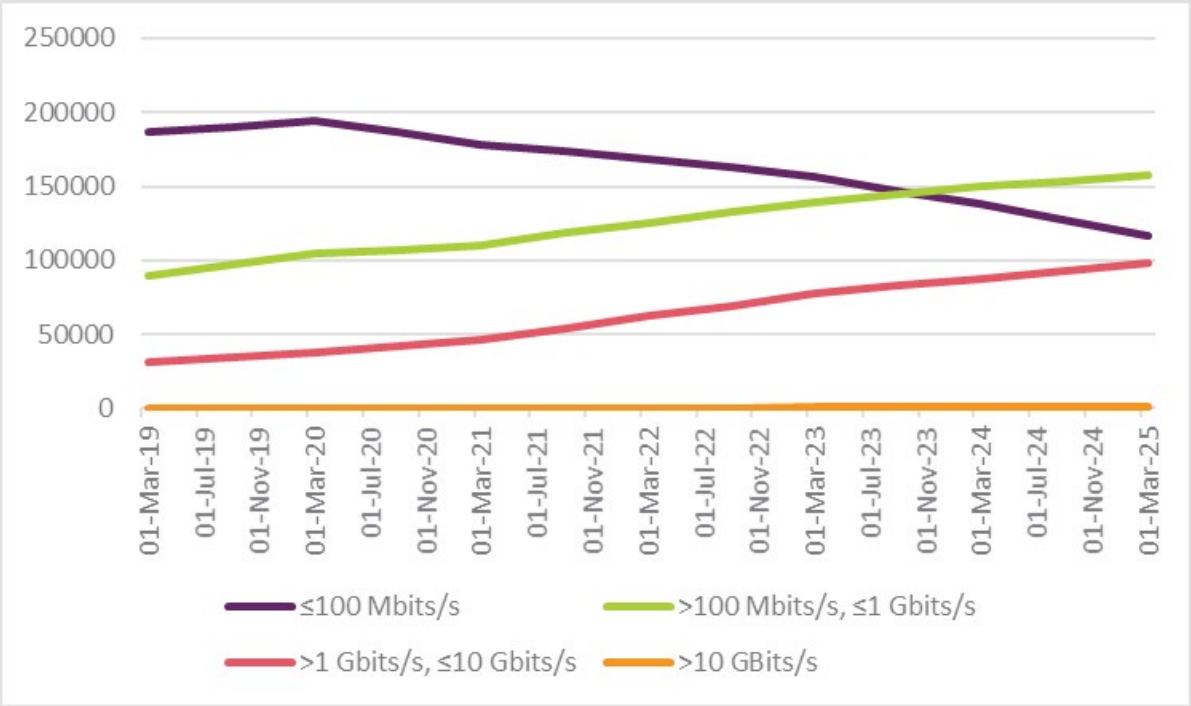
[195] [✂] response to January 2020 Consultation, page 30.

[196] [✂] responses dated [✂] and [✂] to the s.135 notice dated [✂], question 7.

[197] [✂] response dated [✂] to the s.135 notice dated [✂], question 2.

2.108 Despite the expectation that the average speed of leased line products will increase, the evidence suggests that the majority of active products will continue to be at speeds of up to and including 1Gbit/s for the duration of the review period.[198] Figure 2.16 below shows the results of forward-looking analysis of wholesale leased line connections by speed.

Figure 2.16: Wholesale leased line connections by speed, 2019-25 [199]



Source: Ofcom analysis of Centurylink, CityFibre, Colt, Eircom, euNetorks, Fibrespeed, MS3, Openreach, Vodafone, WPD, Zayo forecasts for wholesale leased line connections.[200]

2.109 The forecasts above show that the number of leased lines at speeds of 100Mbit/s or less is expected to decrease over the review period, while the number of 1Gbit/s connections is expected to increase in the same period. Demand for VHB connections is likewise forecast

[198] [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4 and [✂] response dated [✂] to the s.135 notice dated [✂], question 4.

[199] Dark fibre volumes are included in the range >1Gbits/s, ≤10Gbits/s.

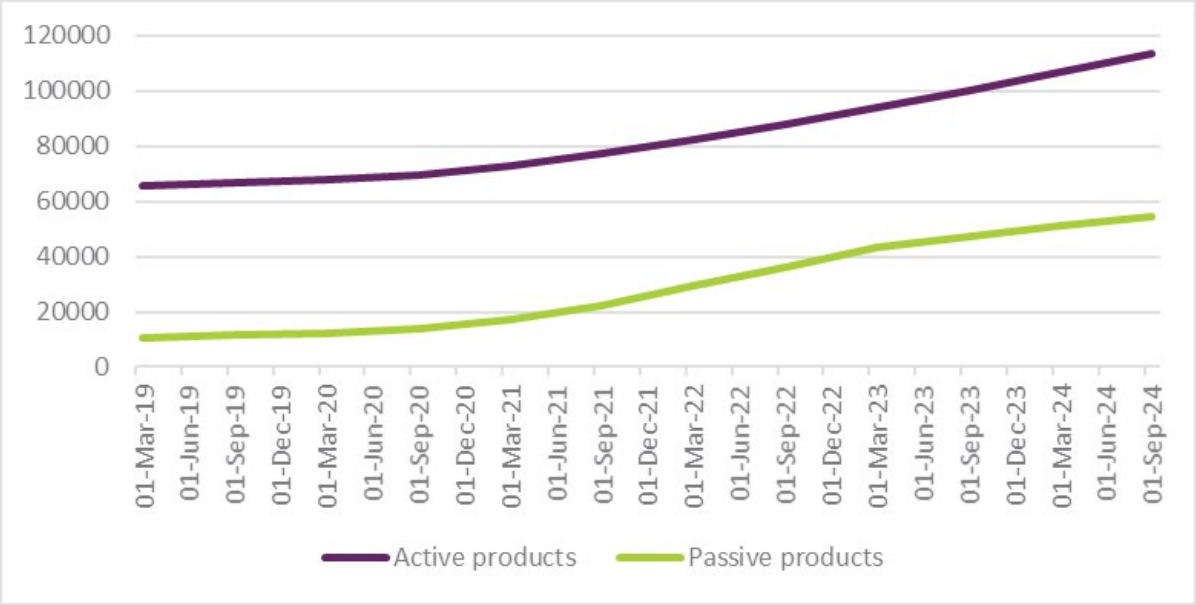
[200] CenturyLink response dated 6 November 2020 to the s.135 notice dated 15 June 2020, question 4; CityFibre response dated 29 January 2021 to the s.135 notice dated 12 June 2020, question 4; Colt response dated 23 July 2020 to the s.135 notice dated 12 June 2020, question 4; Eircom response dated 16 October 2020 to the s.135 notice dated 15 June 2020, question 4; euNetworks response dated 19 October 2020 to the s.135 notice dated 15 June 2020, question 4; FibreSpeed response dated 27 July 2020 to the s.135 notice dated 15 June 2020, question 4; MS3 response dated 23 July 2020 to the s.135 notice dated 15 June 2020, question 4; Openreach response dated 10 September 2020 to the s.135 notice dated 12 June 2020, question 4; Vodafone response dated 3 November 2020 to the s.135 notice dated 15 June 2020, question 4; WPD response dated 18 August 2020 to the s.135 notice dated 15 June 2020, question 4; Zayo response dated 19 August 2020 to the s.135 notice dated 12 June 2020, question 4.

to increase over the next five years. We also looked at retail leased line connections by speed. The data available showed the same trends.

2.110 Information provided by network operators and other stakeholders suggests that this increased demand for higher capacity leased lines will be driven, among other things, by greater business use of cloud-based applications and growth in traffic across the networks more generally.[201] 5G rollout is also expected to require higher capacity leased lines for providing backhaul and core connectivity.[202] However, a number of uncertainties remain surrounding the impact the Covid-19 pandemic will have on future working patterns and how this may affect businesses' demand for leased line services.[203]

2.111 Several operators suggest that they expect increased demand for dark fibre as an alternative to Ethernet and WDM leased line services over the review period.[204] Figure 2.17 below is a forward-looking analysis showing how wholesale volumes of active (Ethernet and WDM) and passive (dark fibre) products are expected to change over the review period.

Figure 2.17: Wholesale leased line connections by product, 2019-2024



[201] [✂] response dated [✂] to the s.135 notice dated [✂], question 4c; [✂] response dated [✂] to the s.135 notice dated [✂], question 4c; [✂] response dated [✂] to the s.135 notice dated [✂], question 4c; [✂] response dated [✂] to the s.135 notice dated [✂], question 4c; [✂] response dated [✂] to the s.135 notice dated [✂], question 4c and [✂] response dated [✂] to the s.135 notice dated [✂], question 4c.
[202] [✂] response dated [✂] to the s.135 notice dated [✂], question 3; [✂] response dated [✂] to the s.135 notice dated [✂], question 3 and [✂] response dated [✂] to the s.135 notice dated [✂], question 3.
[203] [✂] response dated [✂] to the s.135 notice dated [✂], question 4c; [✂] response dated [✂] to the s.135 notice dated [✂], question 4c; [✂] response dated [✂] to the s.135 notice dated [✂], question 4c; [✂] response dated [✂] to the s.135 notice dated [✂], question 4c and [✂] response dated [✂] to the s.135 notice dated [✂], question 4c.
[204] [✂] response dated [✂] to the s.135 notice dated [✂], question 4; [✂] response dated [✂] to the s.135 notice dated [✂], question 4c and [✂] response dated [✂] to the s.135 notice dated [✂], question 4c.

Source: Ofcom analysis of Centurylink, CityFibre, Colt, Eircom, euNetworks, Fibrespeed, MS3, Virgin Media, Vodafone, WPD and Zayo forecasts for wholesale leased line connections.[205]

2.112 The analysis above suggests there will be significant increases in demand for both types of product. Although dark fibre volumes are currently very low, these are expected to increase over the next five years. We also looked at retail leased line connections by product. The data available showed the same trends. One operator, [✂], forecasts that dark fibre will account for the majority of its wholesale connections by the end of the review period. Most of this demand is expected to come from MNOs and public sector customers. This operator forecasts that, in contrast, enterprise customers will continue to use active products.[206]

Business connectivity supply chain

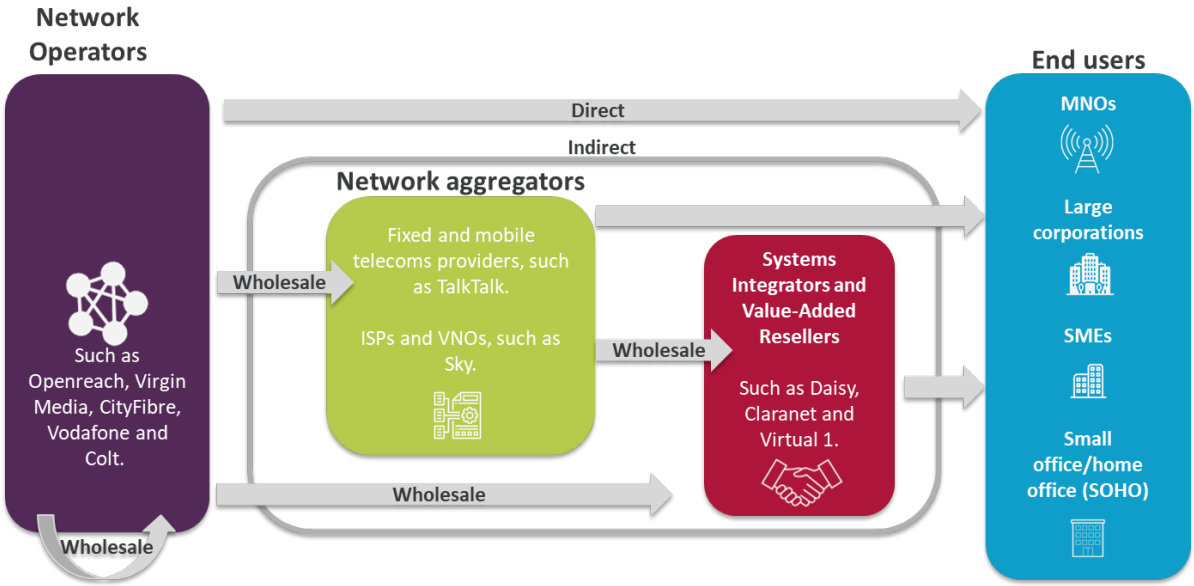
2.113 An illustration of the retail supply chain is shown in Figure 2.18 below. Business connectivity is sold to a wide range of customers – including telecoms providers and ISPs – and that customers have a number of different supplier options when choosing to buy leased line services. Some customers choose to purchase different components of a connectivity service separately, for example purchasing infrastructure and additional services from different suppliers, whereas others prefer to purchase all aspects of a connectivity service from one supplier.[207]

[205] CenturyLink response dated 6 November 2020 to the s.135 notice dated 15 June 2020, question 4; CityFibre response dated 29 January 2021 to the s.135 notice dated 12 June 2020, question 4; Colt response dated 23 July 2020 to the s.135 notice dated 12 June 2020, question 4; Eircom response dated 16 October 2020 to the s.135 notice dated 15 June 2020, question 4; euNetworks response dated 19 October 2020 to the s.135 notice dated 15 June 2020, question 4; FibreSpeed response dated 27 July 2020 to the s.135 notice dated 15 June 2020, question 4; MS3 response dated 23 July 2020 to the s.135 notice dated 15 June 2020, question 4; Virgin Media response dated 24 July 2020 to the s.135 notice dated 12 June 2020, question 4; Vodafone response dated 3 November 2020 to the s.135 notice dated 15 June 2020, question 4; WPD response dated 18 August 2020 to the s.135 notice dated 15 June 2020, question 4 and Zayo response dated 19 August 2020 to the s.135 notice dated 12 June 2020, question 4.

[206] [✂] response dated [✂] to the s.135 notice dated [✂], question 4.

[207] Vodafone response dated 24 February 2021 to the s.135 notice dated 16 February 2021, question 1.

Figure 2.18: High-level view of the business connectivity supply chain



Source: Ofcom. Analysis based on various industry sources.

2.114 Leased line service providers perform a number of different functions in the supply chain. Depending on their business model, providers can be one or several of the following: a network operator, a network aggregator, a value-added reseller or a systems integrator.

- **Network aggregators** buy services from one or more network operators and sell them to customers to provide a national service. They tend to buy circuits which give the best value for money to the end customer. Customers who purchase leased lines through a network aggregator may therefore use services provided over multiple different networks. TalkTalk is an example of a network aggregator which sells broadband and leased line services to end users and to resellers. SSE is an example of a network aggregator and is also a network operator. [208]
- **Value-added resellers** buy services from network operators to offer their customers an end-to-end network connectivity solution. For example, Daisy, Claranet, and Virtual 1 resell TalkTalk services.[209] Resellers may add value to a connectivity service by offering additional services such as cloud services and telephony.[210]
- **Systems integrators** purchase network connectivity services from network operators or aggregators and resell them to end customers. The connectivity is often bundled with other computing services such as data storage (e.g. 'cloud' storage) and applications (e.g. email, file management, security, internet connectivity). The 'bespoke' services provided by systems integrators can be managed on behalf of the customer. Systems integrators range from inhouse IT departments (such as in multinational companies) to

[208] SSE Telecoms, 2019. *Circuit Aggregation* [accessed 19 October 2019].
[209] TalkTalk. *Reseller Partners* [accessed 19 October 2019].
[210] This makes it simpler for an end user to buy end-to-end connectivity and allows the service to be tailored to an individual customer's needs. Research commissioned from Cartesian found that smaller organisations prefer to buy from value-added resellers.[210]

large international companies such as Accenture, Deloitte, BT Global, Cognizant, and Logica (now CGI).
- We describe various types of **network operator** in the following subsection.

2.115 A characteristic of this supply chain is that the end-user may not know which network operator is supplying the underlying leased line, as even a network operator such as Virgin Media may use a mixture of its own and third-party access circuits. BT Enterprise indicated that customers are largely indifferent as to who owns the infrastructure.[211]

Network operators

2.116 Network operators use their own networks to provide end-to-end network connectivity services to customers. Different network operators adopt different business models. For example, Openreach and Virgin Media have national networks, which include access, backhaul and core connections.

2.117 While Openreach sells leased line services exclusively to wholesale customers (such as Sky and TalkTalk) and MNOs, Virgin Media is a vertically integrated supplier, meaning it supplies to both wholesale and retail customers (businesses). CityFibre is also a vertically integrated leased line supplier, selling to a range of wholesale and retail customers.

2.118 Other operators, such as Colt and Zayo, have significant access networks only in certain areas, often central business districts. These leased-line-only networks often target specific types of customer. For example, Colt focuses on providing services to the finance sector and has more recently begun to make dark fibre available to meet increasing mobile 5G backhaul demand.[212]

2.119 In some cases, network operators choose to buy access circuits from Openreach or other network operators and use them alongside their own network (this choice is often referred to as 'on-net' versus 'off-net'). This may be, for example, where they do not have coverage (their network is not near to an end-user site) or it may be more cost effective to buy a third party access circuit than extend their own network by building (this choice is often referred to as 'build' versus 'buy').

2.120 Some providers of leased line services, [✂], have core network infrastructure using dark fibre leased from other operators, but no significant access or backhaul network. They instead purchase wholesale access and backhaul services mainly from Openreach. Other operators, [✂], are present in all parts of the value chain: as a network operator, a network aggregator (to provide national coverage outside their network), and as a user of leased line services i.e. for mobile backhaul to its own mobile base stations.

Switching leased line provider

2.121 Research which we commissioned suggests that there can be significant complexity and costs involved in migrating leased lines, discouraging large businesses and MNOs from

[211] BT response dated 23 February 2021 to the s.135 notice dated 16 February 2021, question 1.
[212] Colt, 2021. *Dark fibre, products and services* [accessed 2 March 2021].

switching providers. There is no migration process for switching suppliers of leased lines, meaning the original service must be cancelled and the new one ordered separately. Consequently, customers generally opt for a period of parallel working to avoid outages.[213]

2.122 SME customers are also often reluctant to switch communications provider, even when dissatisfied with the service they receive. The main reasons for this reluctance are fear of losing continuity of service, perceptions around the hassle and time involved in switching providers and the perception that all providers are the same. However, more engaged SMEs generally have more positive experiences when switching providers, suggesting that fears around switching are worse than the actual experience.[214]

MNOs

2.123 EE, Three, Telefonica and Vodafone are all major buyers of leased line access services, which they use for mobile backhaul. They are the largest individual users of leased line access services and require leased line coverage across a wide geographic area. We estimate that by 2023 they will collectively use over 40,000 leased line circuits.[215] MNOs use leased lines to connect their mobile base stations to a point of aggregation in their core networks, known as mobile backhaul. This can be done using a mix of access and backhaul connections. As discussed above, 5G rollout, which requires high capacity mobile backhaul, is increasing demand from MNOs for dark fibre and VHB products.

2.124 Figure 2.19 below shows forward-looking analysis of leased line connections by speed based on data provided by MNOs. These show that the majority of leased lines currently fall between speeds of 100Mbit/s and 1Gbit/s and this is forecast to remain the case for the duration of the review period. However, the total number of circuits used by MNOs at these bandwidths is forecast to decline slightly over the next five years. The number of circuits at speeds below 100Mbit/s is likewise expected to decrease. Although volumes of circuits at speeds above 1Gbit/s are currently very low, these are expected to increase over the review period.

Figure 2.19: MNO leased lines volumes by speed [216]

[✂].[217]

2.125 This analysis shows an overall trend towards MNOs using increasing volumes of higher bandwidth leased lines over the next five years, although the degree to which this is true varies by operator. Approximately a third of leased lines used by MNOs are expected to be VHB circuits by 2026.

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[213] Ofcom, 2018. *Cartesian Business Connectivity Market Assessment* (2018 Cartesian Report), paragraphs 6.29 and 6.48.
[214] BDRC, 2018. *SME's Communications Needs: A Report for Ofcom*. page 23 and 29.
[215] [✂] response dated [✂] to the s.135 notice dated [✂], question 2; [✂] response dated [✂] to the s.135 notice dated [✂], question 2; [✂] response dated [✂] to the s.135 notice dated [✂], question 2; [✂] response dated [✂] to the s.135 notice dated [✂], question 2.
[216] For [✂] any dark fibre volumes are included in the range >1Gbits/s, ≤10Gbits/s. [✂]
[217] [✂] response dated [✂] to the s.135 notice dated [✂], question 2; [✂] response dated [✂] to the s.135 notice dated [✂], question 2; [✂] response dated [✂] to the s.135 notice dated [✂], question 2; [✂] response dated [✂] to the s.135 notice dated [✂], question 2.

2.126 Information about recent tenders suggests that MNOs are using a range of leased line products, including both dark fibre and WDM services. For example:

- One stakeholder [✂] told us that it recently tendered for dark fibre products and entered into a contract with [✂] for the provision of WDM products. [218]
- Another stakeholder [✂] told us that its recent tender covered a range of leased line access solutions, including, Ethernet, dark fibre and WDM products. [219]

2.127 Currently, almost all mobile backhaul connectivity uses active products (e.g. Ethernet and WDM) and the majority of circuits are forecast to be still active by 2026. However, our analysis indicates that mobile operators will purchase passive products (dark fibre) which will account for a larger proportion of circuits by the end of the review period.

2.128 The split of the usage of active and passive products will likely vary significantly between MNOs; [✂]. We discuss this variation further when explaining the MNOs' different mobile backhaul strategies below.

2.129 Figure 2.20 below shows forward-looking analysis of mobile backhaul volumes split by supplier, based on data provided by the MNOs. BT has a high share in the provision of leased lines to MNO customers, but evidence submitted by the MNOs shows that MNOs use leased line services provided by a range of suppliers. For example:

- Three has told us that, as a result of a recent tender, it has agreed a [✂] contract with CityFibre, [✂].[220] However, in response to our January 2020 Consultation, Three told us this tender showed that [✂] of its total number of sites could be connected by an alternative fibre network within the next five years, and [✂] of sites in Area 2, the HNRs and the CLA.[221]
- Telefonica has told us that it launched a request for proposals for mobile backhaul solutions in late 2019 [✂]. [222] [✂].[223]

[218] [✂] response dated [✂] to the s.135 notice dated [✂], question 3.
[219] [✂] response dated [✂] to the s.135 notice dated [✂], question 3.
[220] Three response dated 12 November 2020 to the s.135 notice dated 1 October 2020, question 3.
[221] Three response to January 2020 Consultation, paragraph 6.5. Area 2, HNRs and the CLA here refer to geographic areas provisionally defined in the January 2020 Consultation. Our definitions of geographic areas have since been updated. See Section 7.
[222] Telefonica response dated 9 November 2020 to the s.135 notice dated 12 October 2020, question 3.
[223] [✂] response dated [✂] to the s.135 notice dated [✂], question 1-2.

Figure 2.20: MNO leased lines volumes by provider

[✂]. [224]

2.130 The analysis above and the MNOs' submissions also suggest that the use of multiple providers is most likely to increase over the period of the review. For instance:

- One stakeholder [✂] told us that, in addition to leased lines supplied by [✂], it currently buys Ethernet services from [✂] and has contracts for the provision of dark fibre products [✂];[225]
- Another stakeholder[✂] told us that it has contracts for the supply of Ethernet and dark fibre products from [✂];[226]
- [✂] told us that it is also supplied with Ethernet services [✂]; and[227]
- [✂] and [✂] have indicated that mobile backhaul is a target market. This is illustrated by the willingness of both networks to accelerate build when bidding to provide mobile backhaul services [✂].[228]

2.131 [✂].[229] Vodafone told us for this reason its use of smaller networks is largely limited to using dark fibre to address specific needs (e.g. river crossings) and where larger alternative networks, such as CityFibre and Virgin Media, are not present.[230]

MNOs' strategies for mobile backhaul

2.132 Evidence submitted by the MNOs suggests that they pursue different strategies for mobile backhaul and are planning to employ a range of different leased line solutions to accommodate 5G rollout and general growth in traffic over the review period. For instance, [✂]. The MNOs also have different strategies regarding self-build, use of dark fibre supplied by alternative networks and continued use of active services supplied by BT and Openreach.

- [✂] currently has a network sharing arrangement [✂].[231]
- [✂] told us that it is keen to reduce its dependency on BT/Openreach. [✂]. [232] [✂].[233]
- [✂]. [✂] told us that, in Areas 2 and 3, it is reliant on BT/Openreach (especially in Area 3), but that it is beginning to use alternative networks in some parts of areas 2

[224] [✂] response dated [✂] to the s.135 notice dated [✂], question 2; [✂] response dated [✂] to the s.135 notice dated [✂], question 2; [✂] response dated [✂] to the s.135 notice dated [✂], question 2; [✂] response dated [✂] to the s.135 notice dated [✂], question 2.
[225] [✂] response dated [✂] to the s.135 notice dated [✂], question 3.
[226] [✂] response dated [✂] to the s.135 notice dated [✂], question 3.
[227] [✂] response dated [✂] to the s.135 notice dated [✂], question 3.
[228] [✂] response dated [✂] to the s.135 notice dated [✂], question 2; [✂] response dated [✂] to the s.135 notice dated [✂], question 3.
[229] [✂] response dated [✂] to the s.135 notice dated [✂], question 1.
[230] Vodafone response dated 24 February 2021 to the s.135 notice dated 16 February 2021, question 3.
[231] [✂] response dated [✂] to the s.135 notice dated [✂], question 3.
[232] [✂] response dated [✂] to the s.135 notice dated [✂], question 3.
[233] [✂] response dated [✂] to the s.135 notice dated [✂], question 2.

and 3.[234] [✂]. [✂] is considering using PIA to self-build mobile backhaul connections as one of a number of solutions, [✂][235] [✂].[236]

[234] [✂] response dated [✂] to the s.135 notice dated [✂], questions 4-5. CLA, HNRs and Areas 2 and 3 here refer to the geographic areas we proposed to define in the January 2020 Consultation. Our definitions of geographic areas have since been updated. See Section 7.
[235] [✂] response dated [✂] to s.135 notice dated [✂], question 2.
[236] [✂] response dated [✂] to the s.135 notice dated [✂], question 3.

3. Physical infrastructure – product market definition

3.1 In this section, we set out our assessment of the product market definition for our most upstream market – physical infrastructure.

3.2 In summary, we have decided to define a single product market for the supply of wholesale access to physical infrastructure for deploying a telecoms network.

Approach to market analysis

3.3 In the January 2020 Consultation, we proposed to follow a modified greenfield approach. We would first consider whether retail markets would be competitive in a situation where there is no wholesale regulation. If not, then we would assess the corresponding wholesale markets starting at the most upstream market.[237]

Stakeholder responses

3.4 Several stakeholders agreed with our general approach to market analysis.[238]

3.5 The Passive Access Group (PAG) considered that we have failed to properly consider whether physical infrastructure access is the most upstream wholesale market upstream of the relevant retail market. It argued that if we had properly undertaken this exercise, we should have considered dark fibre as an alternative. Moreover, we should have considered whether dark fibre or physical infrastructure access better meet our wider objectives and duties.[239]

3.6 BT noted that in the January 2020 Consultation, we defined separate wholesale markets for wholesale local access (WLA) and leased line access (LL Access). BT considered that we had failed to begin our market definition exercise with an analysis of the retail markets, which is contrary to the market definition guidelines.[240]

3.7 Openreach welcomed the WFTMR regulatory framework and recognised that PIA was an essential part of it. In that context, it was able to support the majority of our PIA proposals. However, it noted that it had some concerns about the approach we had taken to market definition. It agreed with BT that we should have started our market definition exercise with a robust analysis of the retail markets. It added that by not assessing and defining the relevant retail markets, *ex ante* regulation could be wrongly imposed in an upstream market, because (a) there is no SMP at the retail level in the absence of regulation, or (b)

[237] January 2020 Consultation, Volume 2, paragraph 3.3 and Annex 5, paragraphs A5.16-A5.17.
[238] BUUK, page 5; CityFibre, page 30, paragraph 3.11; Borderlands - Cumbria County Council, page3; Gigaclear, page 7; KCOM, page 3; [✂] [name withheld], pages 3-4; Telefonica, page 13, paragraphs 3.1-3.4; [✂] [name withheld], page 2-3 , in their responses to the January 2020 Consultation.
[239] PAG response to January 2020 Consultation, page 4-5.
[240] BT response to January 2020 Consultation, Annex 4, paragraph 6.

the relevant downstream market is already regulated and therefore upstream regulation is not required or proportionate. It argued that defining a market for telecoms physical infrastructure based solely on its physical assets was unsatisfactory, as it led to the finding of SMP for Openreach on a national basis.[241]

Our approach

3.8 We explain our approach to our market definition analysis in Annex 1.[242] In applying this approach, we consider whether retail markets would be competitive in the situation where there is no wholesale regulation.

3.9 Without any wholesale regulation we would expect competition at the retail level to be based on vertically integrated providers (i.e. retail providers that operate their own networks and physical infrastructure).

a) For broadband services, competition would predominantly be driven by BT and Virgin Media. It is possible that others could build their own infrastructure and networks to provide broadband services. However, given the cost of extensive network build, and noting the importance telecoms providers have placed on access to BT's ducts and poles in their own business plans (as explained in Annex 3), we would not expect to see sufficient rival investment in new physical infrastructure to lead to the retail market becoming significantly more competitive.

b) For leased lines, in most areas retail competition would again be largely based on the presence of Virgin Media's network. In some business districts, more competing networks are present. However, even in these areas in past reviews we have generally concluded retail markets would not be competitive absent wholesale regulation.[243] Based on information provided to us by leased lines network providers, there is unlikely to be significant new build (either to increase providers' coverage within business areas where they are already present, or to build into new areas), absent wholesale access to existing physical infrastructure.[244]

3.10 Therefore, in our market definition and market power assessment, we have focused on the extent of competition likely to arise from physical infrastructure, which is self-provided by telecoms providers.

3.11 The approach we have taken to market analysis here is consistent with the one outlined in the 2019 PIMR Statement.[245] As explained in Annex 1,we seek to intervene at the most upstream level of the value chain to minimise regulation in downstream markets and to promote competition as far back into the network as possible. We therefore disagree with Openreach's comment that if there is regulation in a downstream market, regulation

[241] Openreach response to January 2020 Consultation, page 71-72, paragraphs 6.18-6.23, page 70, paragraph 6.13 and page 84, paragraph 6.83.
[242] This takes into account changes to the regulatory framework since our January 2020 Consultation.
[243] In the 2019 BCMR Statement we concluded that BT held SMP in leased lines everywhere except the central London area (CLA), taking the physical infrastructure access (PIA) remedy into account.
[244] See Annex 3.
[245] See in particular, paragraphs 3.9-3.21 in the 2019 PIMR Statement.

upstream is not required or disproportionate. In answer to the PAG's comments, we consider the most upstream level to be at the physical infrastructure layer. We note that access to physical infrastructure is needed in order to install fibre, and thus provides the foundation for network competition. We consider whether dark fibre should also be treated as a separate downstream market from LL Access and IEC in Section 6, and as outlined in Volume 3 Sections 6, we have also considered whether to apply a dark fibre remedy in LL Access and IEC markets. We have also considered the competitive conditions in the respective retail markets. However, as noted in the 2019 PIMR Statement[246] and in previous market reviews, we do not consider it necessary to formally define retail markets to determine whether they are prospectively competitive in the absence of regulation.

Product market definition

3.12 The term physical infrastructure is typically used to refer to all parts of a network which can be used to host elements of a telecoms network. It can include pipes, masts, ducts, inspection chambers, manholes, cabinets, buildings or entries to buildings, antenna installations, towers and poles.[247]

3.13 There are several physical infrastructures in the UK which could potentially support the deployment of telecoms networks by third party access seekers. These vary in their geographic coverage, the type of end-users they connect, and the way in which they connect to end-users. Some of these infrastructures were purpose built to deploy telecoms networks (such as those owned by BT and Virgin Media), whereas others were built to supply non-telecoms services such as electricity, gas, water and railways.

3.14 As set out in Annex 1, we use the hypothetical monopolist test framework to define the scope of the product market. To do this, we must first identify a focal product. The approach is to check whether a hypothetical monopolist of the focal product would find it profitable to set a price above a competitive level. If the price rise would not be profitable, the candidate market is expanded to include the closest substitutes for the focal product, and the price test is repeated.

[246] 2019 PIMR Statement, page 7, paragraph 3.9.

[247] This definition is based on the Broadband Cost Reduction Directive (Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks, 23 May 2014, OJEU L155/1, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0061&from=EN). In that Directive, 'physical infrastructure' is defined as "any element of a network which is intended to host other elements of a network without becoming itself an active element of the network, such as pipes, masts, ducts, inspection chambers, manholes, cabinets, buildings or entries to buildings, antenna installations, towers and poles".

Focal product

Our proposals

3.15 In the January 2020 Consultation, we proposed a focal product of wholesale access to telecoms physical infrastructure for deploying a telecoms network.[248]

Stakeholder responses

3.16 CityFibre agreed with our choice of focal product.[249]

3.17 TalkTalk found our approach to product market definition in the main appropriate.[250] It did however consider that the focal product was too broad, as it was not the narrowest product market that could have been adopted. TalkTalk considered that we should have had one focal market consisting of access to pole infrastructure and another consisting of access to duct infrastructure. It noted that there are differences between the two products when it comes to rolling out telecoms networks, with poles generally cheaper, but having more limited use cases. TalkTalk further argued, that as there may be asymmetries in the competitive constraints imposed by duct infrastructure and pole infrastructure, these two focal markets should be considered separately.[251]

3.18 Openreach considered that our analysis fails to look at differences in overhead and underground physical infrastructure (both telecoms and non-telecoms infrastructure). This is because there are differences in the demand and supply side substitutes, especially when considering the deployment of mobile networks.[252]

Our reasoning and decisions

3.19 We have decided to apply the same focal product as we proposed in the January 2020 Consultation for the reasons set out below.

3.20 Our focal product includes all physical infrastructure which is:

a) deployed for the purposes of supporting a telecoms network (i.e. we exclude non-telecoms infrastructure), irrespective of the owner of that infrastructure; and

b) deployed to host fixed (or 'wired' elements of) telecoms networks (e.g. ducts, poles and chambers). We exclude physical infrastructure which is deployed to host the radio transmission and reception equipment needed for wireless connections in a telecoms network (e.g. masts and antenna installations).

3.21 We have decided to include all operators' telecoms physical infrastructure within the focal product as the underlying product they would be making available to access seekers would be used for the same purpose (i.e. deploying a telecoms network).

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[248] January 2020 Consultation, Volume 2, paragraphs 3.9-3.11.
[249] CityFibre response to January 2020 Consultation, page 30, paragraph 3.14.
[250] TalkTalk response to January 2020 Consultation, page 164, paragraph 8.2.
[251] TalkTalk response to January 2020 Consultation, page 165, paragraphs 8.7-8.9.
[252] Openreach response to January 2020 Consultation, page 73-4, paragraphs 6.31-38.

3.22 We recognise that there are differences between the telecoms physical infrastructures owned by different operators, most notably in terms of the geographic coverage of the network, the breadth and contiguity of that coverage, and the types of premises they connect to. These differences are likely to be an important determinant of the strength of the competitive constraint that different operators impose. Depending on the nature of the network a specific access seeker is deploying, some operators' telecoms physical infrastructure may be better suited than others. We take account of these differences in our analysis of geographic markets and assessment of market power.

3.23 As TalkTalk suggested in its response, in principle we could start with a narrower focal product. Openreach also considered that there might be differences between overhead and underground physical infrastructure. Although it is correct that there are different types of physical infrastructure (i.e. ducts and poles), they are performing a similar function i.e. carrying cables or fibres between two points.[253] We expect competitive conditions for ducts and poles to be sufficiently similar, for them to be put together in the focal product.[254] We note that in the 2019 PIMR, we considered whether it was appropriate to narrow the scope of the focal product.[255] We decided then, as we have now, that a broader focal product inclusive of all physical infrastructure is more appropriate.

Demand side substitution

Our proposals

3.24 We proposed that non-telecoms infrastructure should not be included in the relevant product market. We also proposed that various forms of wireless connections (i.e. microwave, satellite and fixed wireless access (FWA) should not be included in the relevant product market.

Stakeholder responses

Non-telecoms infrastructure

3.25 CityFibre endorsed our view that non-telecoms infrastructure is not a credible substitute for telecoms physical infrastructure. It noted that the negligible use of non-telecoms infrastructure in the UK, is evidence that network builders do not see it as an alternative. It detailed a number of the challenges its predecessor (H20 Networks) experienced when it tried to use sewer systems (e.g. issues around access, lack of breakout points), and its intention to solely and extensively use telecoms infrastructure in the form of Openreach's PIA service. CityFibre further explained the reasons why it did not intend to make use of

[253] By way of illustration, BT's physical infrastructure network comprises a mixture of ducts and poles (often in the same geographic area). It is this network that telecoms providers are accessing, and in general, telecoms providers will use whatever physical infrastructure is available.
[254] We recognise that poles may be unsuitable for telecoms providers deploying some leased lines. However, we do not think this use case will give rise to a material difference in competitive conditions. Indeed, in locations where there is material demand for leased lines, we expect Openreach to have deployed ducts rather than poles.
[255] We note, that in response to the 2018 PIMR Consultation, TalkTalk suggested having two focal products: one for ducted passive networks with limited break-out points and one for ducted passive networks with frequent break-out points.

any non-telecoms infrastructure, i.e. strict access provisions, differences in network topology, lack of accurate information on network capacity, and uncertain access pricing and maintenance costs.[256]

3.26 [✂] agreed that physical infrastructure owned by non-telecoms utilities is rarely suitable for deploying and operating a telecoms network. [✂] stated that this was not just in terms of the initial installation, but also in terms of ensuring the fast repair times required by business end users.[257]

3.27 Gigaclear considered the use of non-telecoms infrastructure "extremely limited". Moreover, where it is used, it considered that it is not to the extent that it could be a constraint on pricing and the terms set by BT. It noted that our view, that there was limited use of non-telecoms infrastructure and growing demand for PIA, is consistent with its own experience. It further commented that it had explored the use of non-telecoms infrastructure, but use cases were limited to, "isolated scenarios such as traversing bottlenecks or unique terrain." It therefore endorsed our view that the 2019 PIMR assessment remains relevant, and market conditions have not changed.[258]

3.28 TalkTalk also agreed that non-telecoms infrastructure was not an effective substitute and would not constrain a small but significant and non-transitory increase in price (SSNIP) by a hypothetical monopolist.[259]

3.29 Telefonica agreed that non-telecoms infrastructure should not be part of the product market as they are insufficient substitutes. It commented that this view aligned with its experience. It added that [✂]. Telefonica stated that this case supported our finding that other forms of infrastructure would not sufficiently constrain telecoms physical infrastructure.[260]

3.30 Openreach considered that the evidence suggests that alternative non-telecoms sources of physical infrastructure could be viable substitutes. It noted some UK and international examples from Analysys Mason's report and other examples from the Government's Future Telecoms Infrastructure Review (e.g. SSE, Zayo, Gigaclear and Councils). It considered that in assessing whether alternative infrastructures are suitable substitutes, we should not consider whether there are impediments to their use, but rather whether those impediments can be overcome. Openreach suggested that the evidence supports the latter conclusion.[261]

3.31 BT considered that non-telecoms physical infrastructure might be viable for use in network deployment in more than isolated cases. It stated that in the 2019 PIMR Statement, we wrongly concluded that non-telecoms physical infrastructure is generally costlier and involves higher operational complexity than telecoms physical infrastructure, making it less

[256] CityFibre response to January 2020 Consultation, page 30-32, paragraphs 3.11-23.
[257] [✂] response to January 2020 Consultation, page 2.
[258] Gigaclear response to January 2020 Consultation, page 7, paragraphs 17-19.
[259] TalkTalk response to January 2020 Consultation, page 165, paragraph 8.10.
[260] Telefonica response to January 2020 Consultation, page 15, paragraph 3.3.
[261] Openreach response to January 2020 Consultation, page 72-3, paragraphs 6.26-6.30.

attractive. It referred to Openreach's response to our 2018 PIMR Consultation, where it argues there was significant evidence that non-telecoms physical infrastructure was used in the provision of telecoms services, such as the examples found in the Future Telecoms Infrastructure Review. It also noted the Analysys Mason report (submitted alongside Openreach's report), which included UK and international examples of low voltage electricity infrastructure being used for FTTP deployment. It further added that the same report also detailed SSE's use of London's sewer network to deploy connectivity services.[262]

Wireless connections

3.32 CityFibre strongly agreed that wireless connections should not be included in the product market. It stated that it had no plans to make use of wireless connections for its deployment, a view supported by its Plum 2020 study, which concluded that 'FWA service quality cannot meet FTTP levels'.[263]

3.33 TalkTalk agreed that all wireless connections would not be effective substitutes for telecoms infrastructure and commented that in all cases they will be marginal technologies with limited impact on competition before 2026.[264]

3.34 Gigaclear supported our proposals on FWA. Given its experience, it noted that FWA solutions are of limited capacity and distance and are therefore poor alternatives to fixed infrastructure.[265]

3.35 Openreach said that the options for placing mobile equipment and substitutes for fixed telecoms infrastructure overhead are substantial. Therefore, our market assessment should consider the existing available mobile/wireless physical infrastructure as a potential alternative.[266]

Our reasoning and decisions

3.36 Demand-side substitutability is used to measure the extent to which customers are prepared to substitute other services for the service in question. We have considered both the direct and indirect constraints on telecoms physical infrastructure.

Non-telecoms physical infrastructure as a direct constraint

3.37 Access to non-telecoms physical infrastructure could be potentially useful in the deployment of telecoms networks. We have therefore considered whether a telecoms network builder would view access to non-telecoms physical infrastructure as a good alternative to infrastructure built to support telecoms networks.

[262] BT response to January 2020 Consultation, Annex 4, page 8-9, paragraphs A4.8-A4.14.
[263] CityFibre response to January 2020 Consultation, page 32, paragraph 3.24.
[264] TalkTalk response to January 2020 Consultation, page 165, paragraph 8.10.
[265] Gigaclear response to January 2020 Consultation, page 7, paragraph 22.
[266] Openreach response to January 2020 Consultation, page 73-4, paragraphs 6.31-38.

3.38 In the January 2020 Consultation, we noted the main arguments which led us to propose that non-telecoms physical infrastructure was not a direct constraint.[267] In summary, those arguments were as follows:[268]

a) Although non-telecoms infrastructure can be used as part of telecoms network deployments, its current use in the UK is relatively limited and represents a small fraction of the total telecoms network deployment;[269]

b) Evidence suggested that there are various reasons why using non-telecoms physical infrastructure at scale is either not viable, or involves relatively higher cost and operational complexity;[270] and

c) No telecoms provider in the UK has so far used non-telecoms physical infrastructure for scale network deployment, despite non-telecoms physical infrastructure being available through commercial deals arranged by the owners of such infrastructure or through use of the ATI Regulations.[271]

3.39 We therefore considered that the evidence suggested that non-telecoms physical infrastructure was a poor substitute for telecoms physical infrastructure for the purposes of deploying telecoms networks, and so we would not expect to see switching at sufficient scale in response to a SSNIP of telecoms physical infrastructure to warrant widening our product market to include it.

3.40 The evidence we have received from stakeholders, in response to our consultation, suggests that the situation has not changed. Using their own experiences as access seekers, stakeholders such as CityFibre, Gigaclear and Telefonica have noted the costs, operational complexities, delays and issues associated with using non-telecoms infrastructure. All of which has meant it continues to remain a weak substitute for telecoms physical infrastructure, and mostly limited in its use cases to where there are no feasible alternatives.[272] We disagree with Openreach that we should not consider whether there are impediments to the use of non-telecoms infrastructure, and instead consider whether those impediments can be overcome. We consider our role, in this instance, is to assess whether non telecoms infrastructure is a suitable substitute to telecoms infrastructure. We note neither Openreach nor BT have provided additional new compelling evidence to suggest that it is.

3.41 In contrast there is significant and growing interest in the PIA product. At the end of 2020 there were over 100 telecoms providers registered with Openreach as PIA customers, and

[267] These were the same key arguments we found persuasive in the 2019 PIMR Statement.
[268] For more detail, see January 2020 Consultation, Volume 2, paragraphs 3.15-3.17.
[269] 2019 PIMR Statement, paragraph 3.57 and Annex 3.
[270] 2019 PIMR Statement, paragraph 3.60.
[271] The Communications (Access to Infrastructure) Regulations 2016 (the ATI Regulations) implement the Broadband Cost Reduction Directive (see footnote 247 above). They are a set of measures intended to reduce the cost of deploying high-speed electronic communications networks, including sharing the physical infrastructure of telecoms network providers as well as infrastructure operators in other sectors (e.g. gas, electricity). They can be found at http://www.legislation.gov.uk/uksi/2016/700/made.
[272] For a more detailed explanation of the challenges involved in using non-telecoms infrastructure for the purpose of deploying networks, please see in particular paragraphs 3.59-3.62 in the 2019 PIMR Statement.

a further [✂] going through the registration process. Of the registered telecoms providers, [✂] were in the process of deploying networks using PIA or had placed orders to do so. Around 23,000km of Openreach ducts and about 140,000 Openreach poles had been used by telecoms providers to deploy networks, or placed order to do so, at the end of 2020.[273] We expect that the use of PIA will increase significantly over the period to 2026 to facilitate network roll-out as set out in Annex 3.

3.42 The available evidence indicates that the barriers to using non-telecoms infrastructure, and the reasoning identified above, will not materially change over the market review period. Therefore, over the course of this review, we do not think the use of non-telecoms physical infrastructure for deploying telecoms networks, will become materially more viable. As such, we have decided that non-telecoms infrastructure should not be included in the relevant physical infrastructure product market.

Wireless as a direct and indirect constraint

3.43 Some telecoms networks use wireless in place of fixed connections. This may be to enable mobile networks, or it may be to take advantage of lower deployment costs. The degree to which wireless can be used, in what form, and at what level in the network architecture, depends on what services are being provided. However, for those parts of delivery where a wireless connection is used, access to physical infrastructure to house cables is not required.

3.44 Wireless therefore represents, in principle, a potential constraint on a hypothetical monopolist of access to telecoms physical infrastructure.[274]

3.45 There are various forms of wireless connection, with different applications. We consider the following applications of wireless:

a) using microwave links for mobile backhaul;

b) using satellite to deliver broadband services; and

c) using FWA[275] to deliver broadband services.

Microwave links

3.46 Microwave links are widely used by mobile network operators for backhaul. We therefore have considered whether the threat of mobile network operators switching from leased lines to microwave for backhaul is an indirect constraint on physical infrastructure.

[273] Information provided by Openreach by email to Ofcom dated 16 February 2021, [✂].
[274] The constraint from wireless could take the form of a direct constraint, or an indirect constraint. The hypothetical monopolist could be directly constrained by access seekers who might have deployed fixed connections switching to using wireless connections in response to a SSNIP, or it could still be indirectly constrained by customers switching downstream from products provided using fixed telecoms physical infrastructure to products provided using wireless connections.
[275] We explain what FWA is and how it might be used by telecoms providers in Annex 2.

3.47 In our January 2020 Consultation, we noted the key arguments that informed our view that microwave links were a poor substitute for leased lines for mobile backhaul.[276] In summary, this was because of their:

a) ability to support only lower capacity links compared to fibre-based backhaul, means access seekers are likely to rely on fixed connections in higher traffic areas;

b) requirement for line of sight (LoS) connectivity;

c) significantly lower transmission range than fibre-based backhaul links; and

d) higher risk of failure because microwave antennas are exposed.

3.48 Generally, microwave links are used for mobile backhaul where MNOs do not need the higher capacity offered by leased lines and use of leased lines would be costly (for example in rural areas). Looking forward, as demand for higher capacity mobile services increases (especially with the deployment of 5G), the effectiveness of microwave backhaul is, therefore, likely to reduce further, only being used to fill gaps where demand is lower and it is not cost-effective or practical to use fibre.

3.49 We also note that we have not received any evidence against our proposals.

3.50 For the reasons set out above we have decided to exclude microwave links from the relevant product market.

Satellite

3.51 Satellite technology can be used to provide broadband services across the UK. We therefore have considered whether the potential for retail customers to switch to satellite-based services is an indirect constraint on physical infrastructure.

3.52 In Annex 2, we explain that currently satellite is not likely to be a good substitute for fixed broadband connections and, as such, does not provide a significant indirect constraint on physical infrastructure. In summary, this is because satellite services offer lower speeds and higher latency and have higher prices.[277]

3.53 We recognise that there are some ongoing developments in satellite technologies (see Annex 2), such as the development of low earth orbit (LEO) satellite systems. However, evidence on the time and cost required to deploy these systems suggests that, over this review period, satellite is unlikely to become a material constraint on fixed line services.

3.54 We also note that we have not received any evidence against our proposals.

3.55 For the reasons set out above we have decided to exclude satellite from the relevant product market.

[276] January 2020 Consultation, Volume 2, paragraphs 3.21-3.23.

[277] A consumer survey we conducted for the 2018 WLA found that at most 2% of consumers said they would consider switching to satellite in response to a 10% SSNIP on fixed-lined broadband; this is lower than or equal to the proportion of consumers that said they would consider giving up internet access (see 2018 WLA Statement, paragraphs 3.90-3.94).

FWA

3.56 FWA technology can be used in network deployment for the provision of broadband services. We therefore have considered whether the opportunity for network operators to use FWA is a direct constraint on fixed infrastructures.

3.57 FWA technology can be used in a number of scenarios:

a) by fixed networks to connect from a nearby distribution point to the premises (i.e. wireless lead-ins);

b) by fixed wireless operators using unlicensed/lightly-licensed spectrum and fixed access services for backhaul[278]; and

c) by mobile network operators using their 4/5G spectrum to connect from cell sites to the premises.

3.58 In Section 6, we discuss FWA in the context of the provision of downstream services. In summary, we find that use of FWA is currently limited to specific circumstances for technical reasons. FWA services are lower capacity and less reliable than fixed access. Also, FWA cannot be deployed in certain build environments. This means that, typically, FWA is used where fixed access would be costly or impractical (for example in rural areas or reaching MDUs).

3.59 The use of light-licensed and license-exempt spectrum is mainly limited to rural and suburban areas. Speeds vary, with basic packages offering speeds from 2Mbit/s up to 30Mbit/s. Many packages have data caps, although more packages are offering higher or unlimited data. Interference from nearby services operating on the same frequencies is common and capacity constraints and LoS issues can make it difficult to scale these services.

3.60 Looking forward, EE, Three and Vodafone have all launched retail fixed broadband products using 4G and 5G (with fixed wireless services on 5G offering higher speeds and higher capacity). These services share many of the characteristics of mobile broadband but are optimised for home usage. Depending on traffic and capacity in the network, speeds can vary and are around 20Mbit/s for 4G and 150Mbit/s for 5G for an average user experience.

3.61 We understand from discussions with telecoms providers, that we could see developments in FWA technology (although there is uncertainty about how FWA might develop).[279] Nevertheless, we understand that use of FWA will likely continue to be limited to certain circumstances. For example, the provision of 4G/5G fixed broadband services will be targeted at customers in parts of the UK that are poorly served by fixed broadband services and where the mobile networks have spare capacity. We understand that, in the longer

[278] See Annex 2 for discussion of these networks.

[279] In Section 6, we have considered whether wireless technologies are a direct constraint, and therefore substitutable, with fixed access services assuming the remedies applied in the telecoms physical infrastructure market in Volumes 3 and 4, based on the SMP findings set out in Section 8.

term, the bandwidth demands of fixed broadband services may mean mobile networks do not have the capacity to support mass provision of these services.

3.62 Also, FWA providers will still require access to physical infrastructure for fixed links to cell sites or nests of cell sites.[280] The opportunities for using FWA technologies are likely to be limited to certain elements of telecoms physical infrastructure (e.g. lead-ins). This limits the strength of any constraint faced by a hypothetical monopolist of telecoms physical infrastructure from FWA, even if FWA were to prove more successful than expected.

3.63 We note Openreach's contention that FWA could become a potential alternative, however we tend to agree with the other stakeholders that it is currently a poor alternative and unlikely to become a substitute over the course of this review. Therefore, we have decided to exclude FWA from the relevant product market.

Supply side substitution

3.64 Supply-side substitutability is used to measure the extent to which suppliers other than those offering the service in question would be able to switch, or increase, production to supply the relevant services.

Our proposals

3.65 We proposed in the January 2020 Consultation that there were no supply side substitutes for access to telecoms physical infrastructure.

Stakeholder responses

3.66 CityFibre considered there is very limited scope for supply side substitutability. One important reason for this was the long time it took to deploy such infrastructure. CityFibre, noting its own experience, considered that building a comprehensive telecoms network in a British city, would take more than three years.[281]

3.67 TalkTalk considered there was no scope for supply-side substitution given the high fixed and sunk costs involved.[282]

3.68 BT considered that, by not sufficiently taking into account the viability of non-telecoms physical infrastructure for use in deployments in more than niche cases, we had

[280] There is currently uncertainty about what FWA deployments will look like, and the extent to which they will use fixed connections. Various network configurations are possible, with some still very reliant on access to telecoms physical infrastructure for fixed connections. For example, one possibility is that fibre is used for connections up to very distributed small cells, with 5G used to deliver only the 'lead-in' to the customers' premises. In this case, the backhaul required for these cells could have a very high degree of overlap with a full fibre broadband network. Conversely, FWA might be provided over a smaller number of less distributed cells, and/or cells could be connected to the network using wireless backhaul. In this case, there would be less reliance on access to physical infrastructure, although it would still be required in parts of the network.
[281] CityFibre response to January 2020 Consultation, page 32, paragraph 3.25.
[282] TalkTalk response to January 2020 Consultation, page 163, paragraph 8.11.

understated the role others' infrastructure could play in network deployments, and therefore the extent of potential supply side substitution.[283]

Our reasoning and decisions

3.69 In the January 2020 Consultation, we stated that potential entry to supply telecoms physical infrastructure access takes considerable time and involves significant sunk costs.[284] We do not think the use of non-telecoms infrastructure would lessen these costs, and would present other significant challenges.[285] Therefore, as we have seen no evidence to change our view, we have decided that there are no supply-side substitutes for access to telecoms physical infrastructure.

Our conclusions

3.70 We have decided that the product market is the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network.

[283] BT response to January 2020 Consultation, Annex 4, page 8, paragraph A4.8.
[284] January 2020 Consultation, Volume 2, paragraphs 3.33-3.34.
[285] Refer to paragraphs 3.37-3.42 above, which detail the challenges of using non-telecoms infrastructure.

4. Physical infrastructure – geographic market definition

4.1 In this section we consider the geographic dimension of the product market we discussed in the previous section (Section 3). For the reasons set out below, we identify a national geographic market for wholesale access to telecoms physical infrastructure for deploying a telecoms network[286] and consider that the criteria set out in section 79(2B) of the Act are met. In our opinion, it is appropriate to identify this market for the purpose of considering whether to make a market power determination.

Approach to geographic market definition

4.2 When considering the presence of telecoms physical infrastructure, we consider that geographic areas of the UK can be broadly categorised as those where:

a) BT's infrastructure passes virtually every premises and there is limited alternative telecoms infrastructure ('**category A**');

b) alternative telecoms infrastructure has been deployed to support network builders (at present, Virgin Media is the only significant operator with such infrastructure) ('**category B**');

c) a high presence of alternative telecoms infrastructure has been deployed to supply leased lines ('**category C**'); and

d) significantly more alternative telecoms infrastructure has been deployed to supply leased lines than in category C above ('**category D**'). This is essentially central London, where Openreach does not have market power in leased lines.

4.3 We have based this categorisation on our understanding about the presence of broadband and leased lines operators in downstream markets as a proxy for presence upstream.[287]

4.4 Table 4.1 below shows the percentage of the UK (by postcode sectors and by number of premises) that fell within each category in 2018. It also shows the percentage of UK large business sites and mobile sites (taken together) that fell within each category.

[286] Excluding the Hull Area.

[287] See Section 7 and Annex 4. We note that in some cases downstream services are provided over the same network and therefore the same infrastructure; and that there is some sharing of physical infrastructure, but this is currently limited. We also recognise that, in some cases, downstream services are provided using direct buried cables and, as such, there is no physical infrastructure that is accessible to third parties. We have taken account of these factors in categorising areas of physical infrastructure presence.

Table 4.1: Postcode sectors, premises and large business and mobile sites falling within each category

	Category A	Category B	Category C	Category D	Total (UK excluding Hull area)
Relevant postcode sectors	5,983	3,412	304	275	9,974
% of total postcode sectors in UK excluding Hull Area	60%	34%	3%	3%	100%
Premises in relevant postcode sectors	15,565,626	13,023,612	392,264	174,594	29,156,096
% of total premises in UK excluding Hull Area	53%	45%	1%	1%	100%
Large business sites and mobile sites in the relevant postcode sectors	89,033	59,006	5,438	4,229	157,706
% of total business/mobile sites in UK excluding Hull Area	56%	37%	3%	3%	100%

Source: Ofcom.[288]

4.5 As this is a forward-looking review, we have considered both current and future build plans to 2026.[289] Based on their responses to questions on future build plans, we expect continued deployment of some new infrastructure to support network roll-out.[290] However, we expect that:

- where infrastructure build is independent of the use of PIA, it is to be likely to be locally targeted / geographically limited in scale of roll-out; or
- where the build is at scale it will be dependent on the use of PIA for part of the build.[291]

4.6 In addition, we expect that much of the new network will not be suitable for use by access seekers, as for example, a significant portion is likely to be direct-buried or micro-trenched.[292] Moreover, in general, we consider there to be high barriers to constructing new telecoms physical infrastructure, given the large sunk costs of entry.

[288] This table was used in the 2019 PIMR Statement (Table 3.2, page 34-35). We consider that the four geographic areas defined in the 2019 PIMR Statement map onto the four categories we have set out.
[289] In addition to using the outputs of our Connected Nations programme, which reports on network coverage three times annually, we also used our statutory powers to gather information from a range of telecoms providers since our January 2020 Consultation. We requested information about, among other things, network investment plans and current and future use of physical infrastructure.
[290] Our assessment on the prospects for network build and the use of PIA are set out in Annex 3.
[291] Whilst there is potential for significant deployment of new fibre networks over this period, we consider access to PIA is important to that investment being realised. This suggests that, absent *ex ante* regulation (consistent with the modified greenfield approach), these deployments are far less likely to be as viable or extensive. Any deployment that relies on PIA will leave conditions in the physical infrastructure market unchanged.
[292] We note that it is also unclear how accessible or suitable network built using the PIA remedy will be to third parties.

4.7 In the following sub-sections, we assess whether:

a) the conditions of competition are sufficiently homogenous across all these categories of areas to be defined as a national market; or

b) that competitive conditions are likely to be significantly different and distinguishable between categories of areas such that we should consider defining sub-national markets.[293]

4.8 As explained in Annex 1, in defining the geographic dimension of a market, we aggregate geographic areas into areas where conditions of competition are similar or sufficiently homogenous. There is no requirement for competitive conditions to be perfectly homogeneous across all geographic areas included within one market.

4.9 As there is no significant active market[294] in the supply of wholesale access to telecoms physical infrastructure (it is largely used only for self-supply), we do not focus on market shares of infrastructure supply to evidence differences in competitive conditions between areas.[295] Instead, we carry out a qualitative assessment of conditions of competition based on the needs of telecoms physical infrastructure access seekers.[296]

4.10 In the following sub-section, we therefore first consider what access seekers need and then go on to assess the conditions of competition in the four categories of areas we set out above.

Geographic assessment

Ubiquity is a key advantage for access seekers

Our proposals

4.11 In the January 2020 Consultation, we proposed that ubiquitous infrastructure is likely to have material advantages over non-ubiquitous infrastructure for access seekers, wherever they seek to deploy. We explained that, by ubiquitous, we mean an infrastructure which provides the ability to connect to any premises or site within a given geographic area, rather than an infrastructure which provides national coverage.[297, 298]

4.12 As such, ubiquity of an infrastructure is a key characteristic we consider in assessing the competitive conditions in the different categories of areas we have described above.

[293] If we were to consider defining sub-national markets, then we would need to carry out a more granular analysis of different areas of the UK in order to determine the boundaries of those sub-national markets.
[294] Regulated access to Openreach's physical infrastructure is available, but only as a consequence of regulatory obligations to supply PIA. At present, most downstream services are self-supplied, with PIA used only in a small percentage of cases.
[295] We consider BT's shares of current downstream services are the best available indicators of BT's position upstream.
[296] We acknowledge that access seekers wishing to deploy networks may view the constraint imposed by different types of physical infrastructure differently. We take this into account when conducting our assessment.
[297] For the avoidance of doubt, the advantages we outline below mainly derive from the ability to connect to any premises or site within a given geographic area. However, there are further advantages which derive from national coverage.
[298] January 2020 Consultation, Volume 2, paragraphs 4.15-4.23

Stakeholder responses

4.13 CityFibre noted that ubiquity of network is the key factor operators look for when considering using physical infrastructure to deploy a network. Referring to its experience, given the time required to learn the relevant ordering process and deploy networks, it considered a 'mix and match' approach to be unrealistic. It further noted that ubiquitous network provides greater flexibility to expand and alter plans in response to changes in demand. The only constraint (in theory) to its plans would therefore be on the demand side. CityFibre further argued that ubiquity is needed not just at a local level but also nationally. If it had to use a non-ubiquitous network, it would constrain the ability of operators to deploy nationally and would mean operators would need to either self-build or use alternative infrastructure, which it considers unattractive to any network provider looking to deploy.[299]

4.14 Gigaclear noted that its experience as a network operator supports our view that ubiquity is a critical characteristic when assessing competitive conditions. It stressed that ubiquity should not be understood as "national ubiquity", but rather it is valuable when regional areas are "blanket covered". It commented that [✂]. Considering the previous points, Gigaclear concluded that BT's ubiquitous infrastructure gives it a substantial competitive advantage over other telecoms physical infrastructure.[300]

4.15 [✂] agreed that the need for ubiquitous infrastructure is essential. It stated that most networks are built to sites following demand and that connections to a new premise are much more likely to occur with a ubiquitous network than one that is not. It added that for broadband providers to have access to a ubiquitous network provides additional material advantages; beyond those listed.[301]

4.16 TalkTalk generally agreed that ubiquity is important for access seekers. However, it considered that ubiquity is only needed locally, rather than nationally. It stated that access seekers could use more than one physical infrastructure provider, if its network covered a sufficient proportion of the UK to make the increased cost and complexity of adding another network worth it [✂]. TalkTalk considered this had important implications for our analysis, noting various examples of where different telecoms providers might have differing geographic needs in terms of access to physical infrastructure. It added that we had assumed that all access seekers want full national coverage, which it considered incorrect.[302]

4.17 [✂] agreed about the importance of localised ubiquity. It noted that there is a substantial difference in network scale between Openreach and any local competitor. Moreover, given this differential, it would take a long time to deploy enough infrastructure to compete with

[299] CityFibre response to January 2020 Consultation, page 33, paragraphs 3.29-33.
[300] Gigaclear response to January 2020 Consultation, page 8, paragraphs 23-28.
[301] [✂] [name withheld] response to January 2020 Consultation, page 2.
[302] TalkTalk response to January 2020 Consultation, page 169, paragraphs 8.17-8.21.

Openreach. Therefore, Openreach has a clear advantage over competitors that will be maintained for a long time.[303]

4.18 BT disagreed that, for access seekers, a ubiquitous provider was likely to have material advantages over a non-ubiquitous infrastructure provider. It noted three primary reasons for this view:

- Virgin Media and many other network providers in the leased line market do not need ubiquity to enter and successfully operate in this market. It noted that they do not necessarily need to deploy at scale in an area, or across several areas, and therefore do not need ubiquitous infrastructure.
- Virgin Media's network does put competitive pressure on BT and is accessible by other operators via ATI Regulations.[304]
- We understate the extent to which alternative networks can 'mix and match' physical infrastructure from other network providers and integrate with their own self-build plans. It argued that this suggests that access to one ubiquitous network, is not necessary for a telecoms provider to compete in the WLA or LL Access markets.[305]

4.19 Openreach noted its support for a "practical and proportionate PIA remedy". It considered its engagement with stakeholders and successful launch of PIA over 2019, evidenced its commitment and support for the remedy. However, it did have a number of concerns about our approach and analysis.[306,307] Openreach considered:

- We put too much weight on ubiquity. Citing Virgin Media's successful market entry, it considered we failed to establish that ubiquity or near ubiquity was needed to enter and compete in downstream markets. It added that suppliers do not rely on PIA to meet all of their needs and choose a mix of self-build and rental from other providers. Moreover, if ubiquity was that important, new providers' networks (e.g. Gigaclear) would have negligible value and would not be able to secure funding.[308]
- Network providers did not need contiguous coverage to constrain Openreach (e.g. Virgin Media). Moreover, even small geographic areas can be attractive to competitors, as shown by for example Hyperoptic, which targets high value business sites.[309]
- By placing so much weight on ubiquity, we preclude other options, such as the use of ATI Regulations. By reviewing and detailing expectations for the ATI Regulations (e.g. charges, response deadlines, other terms and conditions) we would help network providers in situations where there is no existing physical infrastructure, such as connections to new build sites.[310]

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[303] [✂] [name withheld] response to January 2020 Consultation, page 2.
[304] The Communications (Access to Infrastructure) Regulations 2016.
[305] BT response to January 2020 Consultation, Annex 4, page 10, paragraph 4.17.
[306] Openreach response to January 2020 Consultation, paragraph 6.84.
[307] We note that a number of the above comments were in Openreach's response to our SMP analysis and findings. We have addressed these comments here, for the sake of brevity and in order to avoid repetition.
[308] Openreach response to January 2020 Consultation, paragraph 6.68.
[309] Openreach response to January 2020 Consultation, paragraphs 6.72-6.73.
[310] Openreach response to January 2020 Consultation, paragraphs 6.70 and 6.83.

Our reasoning and decision

4.20 A ubiquitous telecoms physical infrastructure will be preferred by access seekers to alternative telecoms physical infrastructure which is not ubiquitous. As explained above, by ubiquitous we mean an infrastructure which provides the ability to connect to any premises or site within a given geographic area, rather than national coverage.[311]

4.21 We also agree that some access seekers do not deploy a network to all residential premises and/or business sites within a deployment area. However, our view on the advantage that a ubiquitous infrastructure offers is not predicated on access seekers needing to connect to all premises and sites for their business model to be viable.[312] Rather, we consider that it is the ability to connect to any premises or site within an area that is important.

4.22 We consider that ubiquity is important because:

- Most telecoms networks are built to connect to premises or sites in response to demand, and the precise location of this demand is not known at the point of network deployment. Irrespective of the business model[313] adopted, the ability to provide any connection in response to future demand, quickly and without significant cost, is likely to be important.[314] This is more likely to be possible if using a ubiquitous infrastructure, than one that is not ubiquitous.[315]
- The benefits of using a ubiquitous infrastructure to expand the scale and scope of its initial deployment without significant additional connection cost and time lags, are material. It provides an option value to access seekers, reducing the need to pre-specify rollout plans *ex ante*. This flexibility is also likely to be important for risky investments where demand may evolve over time.[316]

4.23 Therefore, access seekers are likely to value a more ubiquitous physical infrastructure wherever they are seeking to deploy. Even if it is theoretically possible for an access seeker to deploy to a commercially attractive number of premises using a non-ubiquitous infrastructure, using a ubiquitous infrastructure is likely to offer material advantages, for the reasons above.[317]

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[311] For the avoidance of doubt, the advantages we outline below mainly derive from the ability to connect to any premises or site within a given geographic area. However, there are further advantages which derive from national coverage.
[312] As such, arguments related to the level of coverage required for a deployment to be considered commercially attractive are not relevant. We note the argument that a commercially attractive deployment would only need to cover a subset of premises and large business sites in area. The advantages we consider of a ubiquitous infrastructure apply even if an access seeker was targeting a smaller proportion of premises and business sites within a deployment area.
[313] For example, whether targeting certain types of customers or all types of customers.
[314] This is also likely to reduce lead times and increase certainty of delivery dates, which end users of leased lines consider important factors when choosing supplier. See 2019 BCMR Statement, Section 6, paragraph 6.53 and Annex 11.
[315] A ubiquitous infrastructure will also enable multiple routes between two given connection points, offering greater resilience for certain customers.
[316] The telecommunications sector is fast-moving and dynamic, with continually evolving demand and supply, driven by innovation in technology and customer services and changes in consumer preferences. By their nature these changes cannot be predicted with certainty.
[317] We note that as there is only one ubiquitous infrastructure in the UK, using it enables an access seeker to reach the areas where there is less existing downstream competition from retail services provided over alternative, non-ubiquitous infrastructures. On the other hand, using a non-ubiquitous infrastructure confines an access seeker to areas where there

4.24 We acknowledge that in some circumstances it may be possible to combine multiple non-ubiquitous infrastructures, or supplement use of non-ubiquitous infrastructure with partial self-build. However, we consider that access seekers will seek to minimise the number of alternative infrastructures used to deploy their network, due to the costs and uncertainty associated with combining multiple infrastructures.[318]

4.25 We recognise that an access seeker might not deploy a network exclusively using a single infrastructure and as such access seekers will mix-and-match on occasion. For example:

- access seekers may desire a different network architecture to that offered by any single existing infrastructure;[319]
- capacity constraints in the existing network (including directly buried lead-ins which cannot be used by access seekers) may compel an access seeker to utilise alternatives to provide those connections; and
- local authorities may have expressed a strong preference for making use of their assets, in order to avoid disruption.[320]

4.26 However, as we have seen from the feedback and consultation responses from access seekers, in general, such usage of self-build and mix-and-match is based on necessity, rather than preference, and so would not constrain the behaviour of owners of ubiquitous infrastructure. While self-build and mix-and-match can complement access to ubiquitous infrastructure, it is not a substitute for it.

4.27 We do not agree that Virgin Media's and other operators' ability to compete in downstream segments, such as in the provision of leased lines and/or residential services, is determinative of their ability to compete upstream in physical infrastructure. For example, there are a number of network providers that do provide some constraint on BT's provision of backhaul and core services in the IEC market, but do not to any extent provide a competitive constraint on BT's provision of physical infrastructure.[321] Nor do we consider that a provider's ability to compete in downstream markets demonstrates that ubiquity is not required to compete in the physical infrastructure market. We also explain below why

already exist at least two competing infrastructures. The level of existing competition is a relevant factor for access seekers, as it affects the expected take-up and revenue. This is a distinction from when Virgin Media's network was built – it did not face different levels of competitions from alternative infrastructures (there was only BT). Virgin Media's (and other alternative infrastructures') presence now means prospective access seekers face areas of differing degrees of competition.

[318] In the 2019 PIMR Statement (pages 45-46, paragraph 3.169) we identified various costs of combining multiple infrastructures, based on our discussions with stakeholders. These included the cost and time of undertaking civils work to break in and out of different infrastructures; the duplication of maintenance costs associated with multiple infrastructures; and the time, cost and complexity of developing and maintaining multiple stakeholder relationships. This is supported by stakeholder feedback to our consultation. For example, we note [✂]. In the 2019 PIMR Statement we further noted, that combining multiple infrastructures creates uncertainty for investors, which given the risky nature of the investments involved is likely to increase the attractiveness of a ubiquitous infrastructure.

[319] See for example [✂].

[320] [✂].

[321] For an explanation of which providers provide a constraint on BT's provision of IEC services, and why they provide a constraint, please see Section 8.

we think Virgin Media's network does not provide a sufficient constraint on Openreach's provision of physical infrastructure.[322]

4.28 We have therefore decided that a ubiquitous infrastructure is likely to provide material advantages for most access seekers, regardless of scale and scope. This is the key characteristic we test below in assessing the conditions of competition in the different categories of areas we outlined above.

Defining one national geographic market

Our proposals

4.29 In the January 2020 Consultation, we proposed that the geographic market for wholesale access to telecoms physical infrastructure for deploying a telecoms network is the UK (excluding the Hull Area). This single market would therefore include all of the categories of areas (categories A to D) outlined above.

Stakeholder responses

4.30 Both BUUK[323] and CityFibre agreed with our approach to geographic market definition. CityFibre noted that it considered the relevant geographic market to be national; predominantly because of the importance of ubiquity.[324, 325]

4.31 Telefonica agreed with our geographic market definition and conclusions. It welcomed our proposal to define a single national market. It further commented that it considered the market to be national, because competitive conditions are broadly similar, which it noted was clearly demonstrated by our SMP assessment.[326]

4.32 Cumbria County Council did not fully agree that the competitive conditions in the physical infrastructure market are similar across the whole of the UK. It considered that in the Borderlands region there was a lack of capacity to expand or upgrade existing infrastructure and the area needs further targeted public investment. This, it argued, made its region different from other parts of the UK.[327]

4.33 TalkTalk agreed that the four geographic areas represented a broadly appropriate delineation in the event that there is a single product market including both ducts and poles. It further noted that there is no need for perfectly homogenous competitive conditions for different areas to be in the same geographic market, however a strong degree of homogeneity was needed. As such, it further agreed that category A and B areas were likely to be sufficiently homogenous to be part of the same geographic market. It noted that in category B areas, access seekers looking to roll-out networks, were unlikely

[322] See, in particular, paragraphs 4.42-4.45 below.
[323] BUUK response to January 2020 Consultation, page 5.
[324] CityFibre response to January 2020 Consultation, page 30, 32-33, paragraphs 3.11, 3.28-33.
[325] We note that in CityFibre's response it considers ubiquity is important at a local and national level, and hence agree with us that it is important at a local level.
[326] Telefonica response to January 2020 Consultation, page 13, paragraphs 3.1-3.4.
[327] Cumbria County Council response to January 2020 Consultation, page 3.

to do so where Virgin Media is present given the inherent greater competition they would face. Therefore, ubiquity in both areas, is likely to be important for a number of access seekers.

4.34 TalkTalk did not agree that category C or category D areas fall within the same geographic market. It considered that our arguments, supporting category C's inclusion, rested on multi-service networks (MSNs), which have no "meaningful competitive effect" in HNR areas. If we wished to rely on these arguments, we should demonstrate that MSNs have material plans to build into category C areas. It argued that an MSN should have plans to build into, at a minimum, the majority of premises in category C in order to take their potential impact into account. It further argued that the competitive conditions in category D areas, where many leased lines networks are present, are very different to areas where only BT's network is present. It added that there is little benefit in MSNs rolling out to large parts of category D, as most of the demand there is for leased lines. In conclusion, TalkTalk considered that there were three geographic markets: a single market covering category A and B, a second market for category C and a final geographic market for category D areas.[328]

4.35 BT considered that we have not demonstrated that a single national geographic market for physical infrastructure exists. It considered that separate geographic markets exist, along the same lines as the four geographic categories we have outlined or an approach that mirrors the relevant downstream markets.

4.36 BT considered that there were differences in competitive conditions across the four areas. BT also challenged our view, that in category B, Openreach would have cost, capacity and lead-in advantages over Virgin Media. It noted findings from an Analysys Mason report, which indicated no evidence of material differences in the costs of connection and that Virgin Media's lead-ins are much shorter than Openreach's.[329]

4.37 Openreach did not consider that conditions between the four geographic areas were sufficiently homogenous to define one national market for physical infrastructure. It commented that the availability of physical infrastructure and the nature of demand and supply varies greatly by geographic area. On the latter point, it added that in category A areas the provision was likely to be fibre broadband and, for category D areas, leased lines and optical circuits.[330]

4.38 Openreach also questioned the importance of the lead-in cost differential between Openreach and Virgin Media, noting that the differences are likely to be small when compared with the length and value of the business contract. It also referenced Analysys Mason's findings that Virgin Media's network is usually built closer to the customers' premises, and not as expensive to connect to as we assume. It added that if Virgin Media

[328] TalkTalk response to January 2020 Consultation, page 165-8, paragraphs 8.12-26.
[329] BT response to January 2020 Consultation, Annex 4, page 9-10, paragraphs 4.15-19
[330] Openreach response to January 2020 Consultation, page 75-76, paragraphs 6.45-51.

did have such a disadvantage in comparison to Openreach, it might be expected to impede its expansion, which has not happened.[331]

Our reasoning and decisions

4.39 Below, we set out our view of the competitive conditions in the four categories of geographic area we have identified above, before outlining our conclusions on our geographic market assessment for physical infrastructure. As noted, there clearly are geographic differences in the presence of alternative infrastructure to BT. However, access to BT's physical infrastructure network has important advantages for potential access seekers. The result is that competitive constraints on Openreach in supplying access to its physical infrastructure are largely absent in all areas, and on that basis we find competitive conditions to be sufficiently similar to define a national market.

Conditions of competition in areas where there is limited alternative infrastructure (category A)

4.40 In areas where there is limited alternative infrastructure and where BT's infrastructure passes virtually every premises, BT is unlikely to face any competitive constraint.

Conditions of competition in areas where alternative infrastructure has been deployed to support networks with dense coverage, providing mass market broadband and leased line services (category B)

4.41 We consider that conditions of competition are sufficiently homogeneous between category A areas and category B areas such that they can be aggregated for the purpose of geographic market definition. This is because we consider BT does not face an effective constraint in category B areas, for the following reasons:

- As explained above, access seekers are likely to prefer a ubiquitous infrastructure wherever they are seeking to deploy. At present there is one significant alternative infrastructure deployed to support network operators – that owned by Virgin Media. In the areas where Virgin Media is present, its coverage of premises remains below that of BT.[332] In some postcode sectors within its footprint, Virgin Media covers over [✂]% of premises. However, these postcode sectors are distributed across the Virgin Media footprint generally so that there are not large areas with contiguous coverage of over [✂]%.[333]
- Even where Virgin Media and BT cover the same individual premises, we continue to consider that BT's lead-in infrastructure is likely to offer cost[334] and capacity advantages in terms of connecting premises. We consider the cost of lead-ins to be an important consideration for access seekers, when deciding which provider to use. BT's

[331] Openreach response to January 2020 Consultation, paragraphs 6.74-6.
[332] Virgin Media's network may not cover some specific premises in areas where its network is otherwise present or may miss areas of coverage within its wider footprint.
[333] See Annex 4 (Evidence of telecoms physical infrastructure coverage) of the 2019 PIMR Statement which used, among other sources, Connected Nations December 2018 data to estimate contiguous coverage of Virgin Media's network.
[334] We note, in its response to the 2018 PIMR Consultation, Virgin Media broadly agreed that access seekers would face additional costs as a result of Virgin Media's direct bury approach within the premises boundary (Virgin Media's response to the 2018 PIMR Consultation, p.10-11).

infrastructure delivers around 50% of lead-ins overhead[335] whereas Virgin Media's are all underground.[336] This difference in mix of lead-ins means that connecting customers using BT's infrastructure is likely to be quicker and cheaper as using poles is likely to be quicker and cheaper than underground lead-ins. In addition, poles offer greater certainty over whether the existing infrastructure is useable as access seekers can more easily assess the state and capacity of a pole than they can an underground duct. We also understand Virgin Media's infrastructure (such as its Toby boxes[337]) will not have spare capacity to accommodate further cables and cannot readily be used by an access seeker.[338]

4.42 Virgin Media continues to expand its network as part of its Project Lightning. This is likely to mean coverage in some areas increases and could potentially mean there are larger contiguous areas of high penetration.[339] However, the extent to which this addresses the issues above is uncertain and, regarding the advantages of BT's lead-in infrastructure to access seekers over Virgin Media's, unlikely to lead to any material difference.

4.43 We consider this also holds for areas with other infrastructure supporting network builders, since:

- these areas tend to be much smaller than the Virgin Media footprint;
- the ubiquity of alternative infrastructure within these smaller areas is likely to be less than Virgin Media;[340] and
- it is also unlikely to alter the advantage of BT's lead-in infrastructure.

4.44 We therefore consider that other infrastructure is likely to be less attractive to access seekers.

Conditions of competition in areas which have a high presence of alternative infrastructure deployed to supply leased lines (category C)

4.45 Certain geographic areas have a high presence of alternative infrastructure deployed to supply leased lines. Given the nature of the deployment, this infrastructure is typically deployed to provide connections to large business and mobile sites (rather than to maximise coverage to residential premises). As we set out in Section 7, we consider a high presence of leased lines to mean at least two alternative networks that can reach within 50m of more than 65% of large business and mobile sites within a given area. Although we

[335] i.e. dropwires attached to premises from nearby poles.
[336] Either ducted or directly buried.
[337] A small underground access chamber for housing subscriber terminations typically positioned just outside the curtilage of each customer premises passed by the network.
[338] We note Openreach's reference to the Analysys Mason's report it produced in its response to our 2018 PIMR Consultation, and its challenge around the differential in lead-in costs between BT and Virgin Media network infrastructure. We have already addressed these points in the 2019 PIMR Statement, Annex 3, paragraphs 3.22-3.36. We also note that the other arguments raised by Analysys Mason's report were also addressed in the 2019 PIMR Statement, in paragraphs 3.53-3.62 and 3.166-3.172.
[339] Although, as set out in Annex 3, we understand that Virgin Media [✂] of its continued network expansion over the market review period.
[340] Because of their greater use of existing infrastructure and/or micro-trenching to support their network build rather than constructing new infrastructure which could potentially be used by an access seeker.

adopt this as the basis for our assessment below, we do not consider that slight changes in those parameters would materially alter our assessment.

4.46 While there may be greater competition for providing connections to large business and mobile sites, we consider that BT will still not face an effective competitive constraint from alternative infrastructure in these areas. We consider that conditions of competition are therefore sufficiently homogeneous between these areas and category A and category B areas such that they can be aggregated for the purpose of geographic market definition.

4.47 We consider that BT will not face an effective constraint in category C areas for the following reasons:

a) Infrastructure targeted at supplying leased lines has a much lower coverage of all premises within the geographic area than its coverage of mobile and business sites. As such it is much less attractive to providers looking to deploy a network to residential premises than BT's ubiquitous infrastructure.

b) In the majority of cases, when alternative infrastructure is deployed to supply leased lines in a given area, it will not be close to every large business or mobile site in that area.[341] By contrast, BT's infrastructure is typically ubiquitous. In order to deploy a network throughout an area, or to any given set of sites within that area, an access seeker would therefore face significantly higher costs if it needs to combine multiple infrastructures, relative to using BT's ubiquitous infrastructure.

c) Even where alternative infrastructure is close to a large business or mobile site in these areas, on average it is further from the end customer than BT's network.[342] This is likely to give rise to a significant cost advantage of using BT's network.[343] Moreover, where BT's duct is already connected, the convenience from being able to readily connect to a customer is likely to be a significant advantage when seeking to attract downstream leased line customers.[344]

d) Areas with a high presence of alternative infrastructure used to supply leased lines to larger business and mobile sites are generally smaller than that of a typical deployment by a network builder.[345] As such, the limited availability of alternative infrastructures in the surrounding areas means that access seekers will need to combine access to multiple infrastructures, adding time, cost and operational complexity.

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[341] By way of illustration, in 2019 PIMR Statement we found that in 50% of postcode sectors in the high network reach areas where at least one large business or mobile site is located, there was no single alternative infrastructure that was within 50m of every large business or mobile site in the postcode sector. See 2019 PIMR Statement, page 50, paragraph 3.191.

[342] We refer to our assessment of the presence of rival infrastructure using a range of infrastructure indicators in 2019 BCMR, Section 6, paragraphs 6.125 to 6.126 and Table 6.6.

[343] In our 2019 PIMR, page 51, footnote 189 we calculated that using BT's infrastructure would have a cost advantage of around £2,600.

[344] In our 2019 BCMR, page 98, paragraphs 6.52 to 6.53 we explained that BT will more often have a physical infrastructure connection to customer sites. Our analysis showed that BT had existing duct connections to 81-90% of its 2017 new customer ends in the UK excluding the Hull Area, compared to 46% across all rivals, collectively.

[345] See Section 7.

4.48 We note TalkTalk's argument that category C areas should not sit within the same geographic market as category A and B areas. We do not agree that category C area's inclusion in the market rested on MSNs, as several of the arguments we outline supporting its inclusion related, in the main, to leased line networks. We also do not agree that there is "no meaningful competitive effect" in the downstream leased line market potentially arising from build by CityFibre and Virgin Media in high network reach (HNR) areas. We note, for example, that CityFibre is either planning to or already building to sites in a number of HNR areas such as Glasgow, Edinburgh and Leeds (as is the case with Virgin Media).[346]

Conditions of competition in areas with significantly more alternative infrastructure deployed to supply leased lines (category D)

4.49 In our previous market reviews, we have found that an area within London has a uniquely high presence of leased lines networks compared to other areas of the UK.[347] Consequently, we consider this category of area, which we refer to in our downstream market assessment as the central London area (CLA), to have significantly more alternative infrastructure than category C areas. BT has been found not to have SMP for leased lines access in the CLA.[348]

4.50 We note Openreach and TalkTalk's argument that the competitive conditions in downstream markets are quite different, when comparing category A and D areas. However, in the case of the provision of physical infrastructure, we consider that BT is unlikely to face an effective direct competitive constraint from alternative telecoms infrastructure in this area, and therefore consider the conditions of competition to be sufficiently homogeneous to aggregate it with the other categories of areas described above.

4.51 We recognise that, with respect to leased lines, there is significantly more alternative infrastructure present in the CLA, both in aggregate, and in terms of the proportion of the large business and mobile sites that any individual infrastructure covers, than in the other categories of areas we describe above. Whilst this means that it is more likely that an access seeker could provide coverage to the majority of business sites using a single infrastructure which is not BT, we nonetheless consider that BT maintains advantages arising from its control of access to a ubiquitous telecoms physical infrastructure, which grants it cost and time advantages in the installation of new lines.

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[346] See CityFibre's build locations listed on its website, https://www.cityfibre.com/network/. We note that there are a number of postcode sectors in these cities that are HNR areas.

[347] The boundaries of this area have changed as we have periodically reviewed the wholesale services markets for leased lines. Our current review of downstream services is set out in Section 7 where we conclude that the central London area (CLA) is a particularly distinct geographic area with significant density of large businesses and a significant number of operators present. However, the precise delineation of the area is not important to our assessment of physical infrastructure. We are assessing a generic area of very high presence of telecoms physical infrastructure used to supply leased lines.

[348] This was the finding in our 2019 BCMR for the period ending in 2021. We note that the imposition of an unrestricted physical infrastructure access remedy was a factor in this assessment.

4.52 Furthermore, in respect of connecting residential premises, coverage of alternative infrastructures is low: no single alternative infrastructure passes more than 30% of premises in the CLA. This can be compared with BT's infrastructure, which passes nearly all premises. For access seekers wishing to deploy to residential premises, alternative telecoms infrastructure is unlikely to provide an effective constraint on BT given the importance of ubiquity to access seekers (outlined above). As noted in Section 1, over the time period of this review, we expect access seekers to increasingly deploy fibre networks capable of supplying both residential broadband and leased lines (rather than leased lines only networks), such that this factor is likely to become increasingly relevant.

Importance of infrastructure crossing areas with different levels of build

4.53 We also note that access seekers' deployment plans may span across these different categories of areas. Access seekers are likely to consider the availability of alternative infrastructures across their target deployment area. Given the costs of using different infrastructures in different geographic areas, this may reduce the attractiveness of using alternative infrastructures if they only exist in certain areas. This means, for example, that alternative infrastructure in the CLA may be less attractive if that infrastructure is not also available outside the CLA.

Conclusions on geographic market assessment

4.54 As set out above in our approach to geographic assessment, whilst we consider there is potential for significant deployment of new fibre networks over the review period, we expect that in many cases these investments rely on PIA. Even where there is investment in new physical infrastructure, much of it may not be available or suitable for third parties' access.

4.55 Overall our view is that, absent *ex ante* regulation, we can consider all areas of the UK to have sufficiently similar conditions of competition at the moment even considering the presence of differing infrastructures, and that the impact of new build is uncertain but may further blur any boundaries between areas. Even if the presence of alternative infrastructure did develop beyond the categories of areas we have described in our assessment, we believe that ubiquity is the key consideration for access seekers wherever they deploy and the advantage of BT's ubiquitous telecoms physical infrastructure would still result in the conditions of competition being similar across all areas.

4.56 For these reasons, we have decided to define a single national geographic market.[349]

Comparison with finding in 2019 PIMR

4.57 We recognise that this decision differs from the view we reached on geographic market definition in the 2019 PIMR Statement (in relation to the review period 2019 – 2021). The 2019 PIMR was our first review of the physical infrastructure market and we undertook a very granular assessment of the presence of alternative infrastructure across the UK. We

[349] Excluding the Hull Area.

defined four sub-national markets on the basis of network presence.[350] However, we found BT to have SMP in each of those four markets. Even in areas with a high presence of alternative infrastructure such as central London, we found that this infrastructure would be unlikely to provide a sufficient constraint on BT. This was primarily because of the advantage offered by the ubiquitous presence of BT's infrastructure and the more attractive features of BT's lead-in infrastructure.

4.58 In its comments on our draft 2019 PIMR statement, the European Commission 'invited Ofcom to revisit' this approach on the grounds that larger geographical units or even a single national market, would not change the SMP finding or the selected remedies and hence the regulatory outcome would be the same. We decided on that occasion that it was appropriate to retain our approach of four separate geographic markets in our final 2019 PIMR statement primarily because this was the first assessment of the relevant market and that our approach mitigated the risk that we would fail adequately to identify differences in the constraints imposed by the alternative telecoms infrastructures which are observed in each different market in the UK. Although we do not place any weight on the European Commission's comments in this review, we note this as relevant context.

4.59 Since the 2019 PIMR Statement, we have met and held discussions with a range of stakeholders and requested further information from operators on more recent deployments and their future plans over the period to 2026. On the basis of the very granular assessment we carried out for the 2019 PIMR, our more recent knowledge and informative feedback from stakeholders to our consultation, we have greater confidence in our understanding of competitive constraints in different areas across the UK and how these are likely to develop over the period of this review. Rather than defining geographic markets on the basis of a count of network presence, we have therefore decided to take a broader view of whether conditions of competition are sufficiently homogeneous across different categories of areas. In this respect, we note that market definition is not an end in itself, but a means of assessing market power.[351]

Application of the three criteria test

4.60 In this subsection we consider whether the three criteria set out in section 79(2B) of the Act is met in relation to the physical infrastructure market.

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[350] We measured the presence of this infrastructure in each of around 10,000 postcode sectors, and then aggregated these into areas where we considered there to be a similar presence of alternative telecoms infrastructure. These areas formed the basis of the four geographic markets we defined: (1) areas where there is no or limited alternative telecoms physical infrastructure to BT; (2) areas with alternative telecoms physical infrastructure that has been deployed to support networks with dense coverage, providing mass market broadband and leased line services; (3) areas outside of the CLA with a high presence of rival telecoms physical infrastructure deployed to support leased lines networks; and (4) the CLA – an area with uniquely high presence of rival telecoms physical infrastructure deployed to support leased lines networks.

[351] This is explained in the EC SMP Guidelines, to which we may have regard: *"It should be recognised that the objective of market definition is not an end in itself, but part of a process, namely assessing the degree of an undertaking's market power."* (EC SMP Guidelines, fn 19). *"In this regard, it is important for NRAs to bear in mind the purpose of market definition, which is not an end in itself but a means to undertaking an analysis of competitive conditions, for the purposes of determining whether ex ante regulation is required or not." (*EC Staff Working Document on the EC SMP Guidelines, page 21).

4.61 As set out in Annex 1, in determining whether to identify a market for the purpose of making a market power determination, we must consider whether the three criteria set out in in subsection 79(2B) of the Act are met. Where we do not consider that the three criteria are met, we may not identify a market for this purpose.

4.62 Our January 2020 Consultation pre-dated the entry into force of section 79(2B) of the Act. However, as we were proposing to define a market that was not listed in the (then applicable) 2014 EC Recommendation, we consulted on the application of the three criteria test (as set out in the EU regulatory framework[352]) to our proposed market.

Our proposals

4.63 We proposed in the January 2020 Consultation that the market for the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network met the three-criteria test. [353]

Stakeholder responses

4.64 A number of respondents agreed with our proposals and considered that the application of the three criteria was met and *ex ante* regulation should be imposed.[354]

4.65 CityFibre agreed with our proposal. It noted that the cost and time required to deploy telecoms physical infrastructure was significant, with an average UK city taking over three years. It added the very high sunk costs involved are a considerable entry barrier and having PIA significantly reduces the build costs. It agreed that BT's market power is "significant and entrenched" and the market did not tend towards effective competition. Moreover, BT is the only provider with ubiquitous coverage, resulting in material market power, including when deploying new networks. It considered *ex-ante* regulation the only credible tool to "promote" competition, because competition laws effects only come into place a number of years after the abuse, by which point the damage to competition has been done. As such, relying on competition law is incompatible with delivering full fibre as quickly as feasible and will not provide the regulatory certainty that is needed.[355]

4.66 Gigaclear also agreed with our proposal. It noted its substantive response addressed the first two criteria. With respect to the third criteria, it considered competition law, when applied to a specific product or market, to be less predictable in its outcomes than specific *ex ante* imposed remedies. Therefore, an operator would not have clarity as to whether competition law would be an effective form of recourse, in addition to the costs, resource and prohibitive timeframe involved.[356] It added that if regulation was not in place, BT

[352] The three criteria under the EU regulatory framework are equivalent to those set out in section 79(2B) of the Act.
[353] January 2020 Consultation, Volume 2, paragraphs 4.45-4.55.
[354] BUUK, page 5; CityFibre, page 56-57; Cumbria County Council, page 3; Gigaclear, page 8; [✂] [name withheld], page 3; and [✂] [name withheld], page 2, in their responses to the January 2020 Consultation.
[355] CityFibre response to January 2020 Consultation, page 56-7, paragraphs 4.5-14.
[356] Gigaclear response to January 2020 Consultation, page 8, paragraphs 28-29.

would be incentivised and able to prevent access, which would reduce competition and worsen consumer choice.[357]

4.67 [✂] considered that without an *ex ante* intervention, there was the possibility of anti-competitive behaviour and/or a re-definition of the PIA product, which would weaken investment in alternative networks.[358]

4.68 BT disagreed with our proposals and the conclusions we had drawn. It noted, that where markets are effectively competitive downstream of PIA, it is unlikely that the three criteria test is met.[359]

4.69 Openreach was also uncomfortable with our conclusions and considered they depended on "very general assumptions". It then detailed its arguments under each criteria:

- **High and non-transitory barriers to entry**: it considered there were some instances where barriers to entry are the same for Openreach and other network providers. Specifically, in the case of "new builds" or "network extensions", though it also considered that in most instances the same barriers would also apply to "network adjustments". It further argued that it was not clear that in all areas of the UK the barriers to entry for other providers were high (in particular, in the CLA). It further considered that if there was to be significant self-build of network infrastructure, or use of non-telecoms infrastructure, in specific regions of the UK, this would constitute compelling evidence that BT did not have SMP in those areas. It also argued that there are different choices in how networks are deployed, depending on geography, technology and the markets served. It considered that it was not clear that the barriers were universal or equally applied across all technologies, services and geographic areas. Openreach did however note that if the PIA remedy was narrower in scope, some of its objections might not apply.
- **Market not tending towards effective competition**: Openreach considered that the market does tend towards effective competition in the CLA and in the case of new builds. Moreover, we should focus on improving the ATI Regulations to enable better use of alternative providers of physical infrastructure.
- **Insufficiency of competition law:** Openreach did recognise the weaknesses inherent in competition law when compared to *ex ante* regulation. However, in its view, this did not justify the broad scope of the PIA remedy. It added that in recent history, sectoral regulators have been more willing to issue very large fines to firms, which do have reputational and other commercial implications.[360]

Our reasoning and decisions

4.70 We note BT's high-level argument that where a downstream market is found competitive, it is unlikely that the three criteria test is met for an upstream market. We disagree with

[357] Gigaclear response to January 2020 Consultation, page 7, paragraphs 17-22.
[358] [✂] [name withheld] response to January 2020 Consultation, page 3.
[359] BT response to January 2020 Consultation, Annex 4, page 11, paragraph A4.21.
[360] Openreach response to January 2020 Consultation, page 76-77, paragraphs 6.52-6.59.

this argument and consider that a competitive finding in one of the downstream markets for one of the services provided, is not determinative as to whether the three criteria test is met in an upstream market.

4.71 We understand that Openreach think that as part of our assessment of the market, we should consider a variety of circumstances found in builds to new site developments. We set out our market analysis for downstream product markets in Section 6. As we explain, we do not consider it appropriate to assess the physical infrastructure market at this level of granularity. However, we do consider its comments in the context of the scope of our PIA remedies in Volume 3 Section 4.

4.72 In response to Openreach's comment on the ATI Regulations, we note that the regulations are used in some instances. Stakeholder feedback also suggests that where they are used, in most instances, it is because of the lack of a better alternative. We further note that they are a separate regulatory regime, which DCMS is currently reviewing.

4.73 The points below detail our thoughts on each of the three criteria before concluding on whether the test is met.

High and non-transitory barriers to entry

4.74 The market we are considering exhibits high and non-transitory barriers to entry. In particular, as noted by for example CityFibre[361] and TalkTalk[362], there are significant structural barriers to entry as entry would require very high levels of investment to install new physical infrastructure and would take considerable time. Moreover, the costs associated with such investment are, to a large degree, likely to be sunk.

4.75 We note, that whilst there is potential for telecoms providers to build and this may include deployment of their own physical infrastructure, these network deployments in many cases may rely on access to BT's infrastructure in some areas or parts of the network, and are unlikely to be of a significant scale to impose a significant competitive constraint on BT.

4.76 We have previously concluded that there are high and non-transitory barriers to entry in these markets, and in the absence of regulation, we see no clear evidence that underlying conditions are likely to change over this review period.

A market which does not tend towards effective competition

4.77 BT's market power is significant and entrenched.[363] The extent of BT's market power has not materially changed over time. In the forthcoming market review period, we do not consider that deployment of alternative physical infrastructure will occur to a sufficient extent to provide effective competition (as explained in Section 5).

[361] CityFibre response to January 2020 Consultation, page 58, paragraphs 4.7-4.14.
[362] TalkTalk response to January 2020 Consultation, page 163, paragraph 8.11.
[363] For the avoidance of doubt this is inclusive of all four categories of geographic area, identified above.

4.78 We are also not aware of factors that may materially reduce the barriers to entry we have identified. For instance, we have not identified any technological developments that will change competitive conditions in this market in the foreseeable future.

4.79 We consider that the markets we have defined will not, in the absence of regulation, tend towards effective competition in foreseeable future.

Insufficiency of competition law

4.80 We set out in the next section our conclusion that BT has SMP in the market we have identified, and our main competition concerns arising from this. Specifically:

- BT could refuse to supply access to its physical infrastructure, and thus continue to restrict competition in the provision of products and services in downstream markets;
- BT could provide access on less favourable terms compared to those obtained by its own downstream businesses; and
- BT could set excessive wholesale charges for access to its physical infrastructure or engage in price squeeze behaviour.

4.81 Competition law, in particular the rules prohibiting the abuse of a dominant position, is an important part of the legal framework that BT needs to comply with. Given its position of SMP (which equates to the competition law concept of dominance) BT has a special responsibility not to allow its actions on the market (where conditions of competition are weak) to distort or impair competition.

4.82 However, we consider that competition law remedies would be insufficient to address the identified competition concerns on their own in this context.

- First, competition law would focus on tackling the abuse of a dominant position and would not be as effective as *ex ante* regulation in promoting downstream competition.
- Second, regulation must remain effective for the review period, and *ex ante* regulation better enables us to do this as it can be tailored to the particular circumstances in the market and services provided.
- Third, competition law does not provide enough regulatory certainty, which itself can undermine downstream competition where there is upstream SMP – and regulatory certainty is important in encouraging long-term investment in competing networks. In contrast, a benefit of *ex ante* regulation is that all industry stakeholders are clear in advance on the regulation that will apply.
- Fourth, *ex ante* regulation can facilitate more timely enforcement due to the greater certainty and specificity provided. Although, as Openreach notes, significant fines do have some reputational and commercial implications, cases often take considerable time, by which point the damage to competition may be irreversible.

4.83 On that basis, while competition law enforcement may be used in appropriate circumstances, we do not consider that it would be sufficient to rely on it alone and that *ex ante* regulation is required.

Conclusion on the application of the three criteria test

4.84 We therefore consider that the three-criteria test set out in section 79(2B) of the Act is met.

Decision on market definition

4.85 We have decided to identify a national market for wholesale access to telecoms physical infrastructure for deploying a telecoms network in the UK (excluding the Hull Area) for the purpose of considering whether to make a market power determination.

5. Physical infrastructure – SMP analysis

5.1 In this section, we carry out our SMP analysis for the market we identified in Section 4.

5.2 In doing so, we focus on whether BT has SMP in respect of the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network.

5.3 To evaluate the extent to which BT would face a competitive constraint in the physical infrastructure market, we have taken the same approach outlined in our January 2020 Consultation, where we assessed the following:

a) **Strength of competition from existing competitors**: we consider whether BT would be constrained by telecoms providers switching to alternative telecoms physical infrastructure already in the market.

b) We consider the **scope for entry and expansion** by new or existing operators deploying new telecoms physical infrastructure, including whether access seekers can enter the market themselves by self-supplying infrastructure.

c) We also consider whether telecoms providers have **countervailing buyer power** which weakens BT's market power.

5.4 In the 2019 PIMR Statement, we found BT to have SMP across the UK (excluding the Hull Area). Here we consider whether there have been developments in the intervening period since these findings were published and we look forward to consider the impact of likely developments over the period of this review to 2026.

Our proposals

5.5 In the January 2020 Consultation, we proposed that, absent *ex ante* regulation, BT would have SMP in our proposed national market for the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network.

Stakeholder responses

5.6 A number of stakeholders agreed with our proposed SMP findings.[364]

5.7 CityFibre agreed with our approach to assessing SMP. It agreed that market shares, in this instance, would not be particularly informative, and that it was correct to look at the requirements of telecoms providers who are seeking to use physical infrastructure, and what this tells us about the competitive constraints on BT.

5.8 CityFibre also agreed with our proposed findings. It looked at the same potential constraints as us, noting the following findings:

[364] BUUK, page 5; CityFibre, page 56-60; [✂], page 2; Cumbria County Council, page 3; Gigaclear, page 9-10; KCOM, page 4; [✂] [name withheld], page3; TalkTalk, page 166; Telefonica, page 13; and [✂] [name withheld], page 3, in their responses to the January 2020 Consultation.

a) **Strength of competition from existing competitors**: Stressing the importance of ubiquity at both a local and national level, CityFibre considered there to be no viable alternative to BT in terms of physical infrastructure. It added, an argument could be made that other physical infrastructure could be used via a "mix and match" approach, but given its own experience of the time and complexity involved in using Openreach's PIA product, it does not believe this to be realistic. It also strongly agreed with our assessment that Virgin Media's network (nor indeed any other providers' network) is not a realistic alternative to Openreach.

b) **Scope for entry and expansion from new or existing competitors:** While there are announcements of significant network deployment, including its own plans, CityFibre agreed with our view that these are dependent on access to the PIA product, and hence not relevant under a modified greenfield approach. It added that currently, other than Virgin Media, there are only minimal alternative networks to BT and that it would take many years to build rival alternatives. Hence, it did not think that entry or expansion by new or existing competitors likely to constrain BT.

c) **Countervailing buyer power**: It agreed that as there are no realistic alternatives to BT, there is no material countervailing buyer power. [✂]. In addition, as BT is the largest consumer of its physical infrastructure and is vertically integrated, it is unlikely to want to provide access, as it would increase competition downstream.[365]

5.9 Gigaclear agreed with our assessment that BT has SMP in this market. It considered that, in its own experience, there were significant costs in terms of time, investment and resources to deploy a network. Moreover, many of the networks that are deploying are dependent on the availability of PIA. It added, that as a vertically integrated entity, and the only ubiquitous network, without regulation BT has the incentive and capability to prevent access to its physical infrastructure. Therefore, without access to PIA, the market for access to physical infrastructure would remain small.[366]

5.10 TalkTalk agreed, that if we maintained the approach set out at consultation, then BT would clearly have SMP in this market. It agreed that BT's network footprint has a far wider spread than other networks, including Virgin Media's. Therefore, BT's network will be more cost effective than using others, and there are likely to be high barriers to entry and no countervailing buyer power. However, if we were to change our proposals on market definition, then BT would be clearly found to have SMP in category A and B areas. TalkTalk also consider it likely that BT has SMP in category C areas, as it has the widest network and the majority of demand is met over its network. In the category D area, TalkTalk thought the conclusion would be more finely balanced, as BT's market share is lower than in other areas and there are more networks present. However, it still considered BT to hold SMP in this market.[367]

[365] CityFibre response to January 2020 Consultation, page 58-61.
[366] Gigaclear response to January 2020 Consultation, page 9-10, paragraphs 30-38.
[367] TalkTalk response to January 2020 Consultation, page 166-167, paragraphs 8.27-8.30.

5.11 BT disagreed with our approach to assessing SMP. If considered that we should have reached the conclusion that, where there is competition in the downstream market from end to end providers, BT's control of inputs upstream cannot be a source of market power.

5.12 BT also disagreed with our SMP findings, noting that it considered we had overstated BT's market power in physical infrastructure. It argued we had under-estimated the impact of non-telecoms infrastructure and may have missed developments, such as new cases of self-build or mix-and-match with telecoms and non-telecoms physical infrastructure. It added that we had not fully taken into account the potential impact of the ATI Regulations to allow access to physical infrastructure. It also argued that we had not recognised that in many instances Openreach has no competitive advantage (e.g. new build developments) and indeed may have a competitive disadvantage, such as when a developer agrees to an exclusivity arrangement with a non-BT provider. BT concluded that in the CLA, HNR areas and potentially all of Area 2, our SMP findings were not justified.[368]

5.13 Openreach had a number of additional concerns about our analysis to support our conclusions on SMP.[369] Specifically, Openreach considered:[370]

a) We should take into account the strong competitive constraints from Virgin Media, other providers, and non-telecoms infrastructure.[371]

b) With Virgin Media facing no regulatory obligations, it considered our proposals lacked proportionality, as the differences between Virgin Media's and Openreach's networks are not so great so as to have radically different regulatory treatment. It added that there are some areas where Virgin Media or other altnets have duct, but Openreach has none, and this has not been addressed in our consultation.[372]

c) Our analysis assumed that for there to be a constraint on BT, all access seekers need to be willing to use an alternative physical infrastructure provider. Openreach considered this assumption to be flawed, and what matters is instead that there are just enough access seekers willing to use an alternative, to make BT respond to this competitive constraint.[373]

d) That our approach was too high level. It considered there to be significant regional variations in competitive conditions, and we should have looked more closely at the market power in different areas. Our proposals to consolidate sub-national markets, into a single national market, has meant that the substantial differences in market power in different areas has not been given enough weight. It considered the competitive differences most marked in the HNR areas and the CLA (category C and D areas), where it argued it does not have SMP. In HNR areas, it argued that we cannot

[368] BT response to January 2020 Consultation, Annex 4, page 11-12, paragraphs A4.22-24.
[369] Openreach response to January 2020 Consultation, paragraph 6.84.
[370] We note that a number of Openreach's comments that also relate to SMP have already been addressed in Section 4. For the sake of brevity, we have not addressed them here as well.
[371] We have explained why we do not consider non-telecoms infrastructure to be a sufficient constraint in Section 3 and have not sought to repeat those arguments here.
[372] Openreach response to January 2020 Consultation, paragraphs 6.77-8.
[373] Openreach response to January 2020 Consultation, paragraph 6.65.

find that it has SMP because it has physical infrastructure in place. Instead, we would need a "robust" finding of SMP in the downstream market, before concluding that it has SMP. Similarly, for the CLA, it argued that with a no SMP finding downstream, we should not find SMP upstream in the PIA market.[374]

Our reasoning and decisions

Strength of competition from other owners of telecoms infrastructure[375]

5.14 In the 2019 PIMR Statement, we found there to be some commercial supply of access to infrastructure between telecoms providers but that this was very limited.[376] In this review, we have asked network operators, looking forward to 2026, about their expectations regarding the use of third-party physical infrastructure. The responses we received indicated that the only material change would likely be the opportunities for greater access to BT's infrastructure provided by the regulation imposed in the 2019 PIMR Statement.[377] This is supported by the responses we have received from access seekers to our January 2020 Consultation, our assessment on the use of PIA in Annex 3 which also includes data gathered from Openreach on demand for the PIA remedy. This suggests to us that, absent *ex ante* regulation, the commercial market for the supply of wholesale access to telecoms physical infrastructure would be likely to remain small over the period of this review.

5.15 Generally, in an SMP analysis we would consider market shares within the given market being considered. However, trying to calculate market shares in the supply of access to infrastructure is difficult and not very enlightening, because of the significant use of it for own infrastructure which means that like-for-like comparisons of usage of the infrastructure, or revenues from it, cannot easily be assessed. In our January 2020 Consultation, we therefore focussed on assessing the strength of competition to BT from existing competitors based on information from access seekers about what matters to them, including in relation to the characteristics of those networks. In doing so, we acknowledged that there are likely to be multiple potential types of access seeker wishing to deploy telecoms networks, who may view the constraint imposed by different types of physical infrastructure differently.

5.16 As highlighted by stakeholder engagement and responses to our January 2020 Consultation, we consider that competitive conditions have not changed materially since we published the 2019 PIMR Statement.

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[374] Openreach response to January 2020 Consultation, paragraphs 6.62, 6.65, and 6.79-82.
[375] We respond to Openreach's and BT's comments on the substitutability of non-telecoms infrastructure and on the sufficiency of the ATI Regulations to address our competition concerns in Sections 3 and 4. For the sake of brevity, we have not sought to repeat them and our responses here.
[376] 2019 PIMR Statement, Annex 3, paragraphs A3.2 to A3.7.
[377] Since the January 2020 Consultation, we sent s.135 notices to many network operators asking, among other things, about their current and future use of different forms of physical infrastructure. Our assessment on the use of PIA is set out in Annex 3.

5.17 As set out in Section 4, we consider a ubiquitous telecoms physical infrastructure is likely to be preferred by access seekers to alternative telecoms physical infrastructure which is not ubiquitous.

5.18 In Section 4, we have also looked at the competitive conditions in different geographic areas and sought to understand the constraints on BT's provision of physical infrastructure. As explained, there are clearly geographic difference in the presence of alternative infrastructure to BT. However, access to BT's physical infrastructure network has important advantages for potential access seekers. The result is that competitive constraints on Openreach in supplying access to its physical infrastructure are largely absent in all areas, and on that basis we find competitive conditions to be sufficiently similar to define a national market. We have set out why we have decided to define a single national market, in contrast to our approach in the 2019 PIMR Statement.[378]

5.19 Existing alternative physical infrastructure is largely that owned by Virgin Media and leased line only networks.

5.20 In relation to Virgin Media infrastructure, as explained in Section 4:

- it does not provide the same level of coverage as BT infrastructure;
- BT's lead-in infrastructure may offer it cost and time advantages; and
- whilst Virgin Media's Project Lightning is extending its coverage, the extent to which this makes its coverage ubiquitous in any area (i.e. comparable to BT), and whether it can be used by access seekers, is uncertain.

5.21 This means that using BT infrastructure is likely to be cheaper, quicker and easier to use than Virgin Media infrastructure. We found the same arguments compelling and applicable to any other non-BT network builder.

5.22 In relation to category C and D areas[379], we note that BT does not face a significant constraint with respect to the provision of downstream wholesale local access services in the CLA, as our own coverage analysis shows that there is low coverage by other broadband operators in this area. We further note, that even in these areas (inclusive of the CLA), BT's infrastructure has advantages as it is generally closer to end customers than rival infrastructure. We also consider the overall strength of the constraint will reflect the combined impact of the constraints imposed in the various downstream markets.

5.23 As noted above, Openreach considered that in order for other networks to be a sufficient constraint, it is not required that all access seekers are willing to use alternatives to Openreach, instead, "*just that a sufficient proportion can use alternatives to a degree that BT needs to respond*". However, we find that there is limited interest in access to alternative physical infrastructure, as indicated by stakeholder responses. We have explained here and in earlier sections why we consider Virgin Media and other network

[378] Please see Section 4, for our explanation as to why we have defined a national market in this instance.
[379] Areas where there is a high or very high presence of alternative telecoms infrastructure that has been deployed to supply leased lines.

providers to be a weak constraint on Openreach.[380] As detailed in our engagement with stakeholders and feedback to our consultation, there remain very few cases where access seekers have sought to use alternative physical infrastructure, and there remains limited appetite to use such infrastructure in the future. Moreover, as noted in previous sections, where alternative infrastructure has been used, these decisions have been driven, for the most part, by necessity rather than choice.

5.24 We do not agree that our proposals are disproportionate. We accept that there are likely to be some small geographic areas (e.g. areas of new build) where Virgin Media or other networks have physical infrastructure and BT does not. We do not think this undermines our analysis or findings, nor BT's inherent advantages over other providers in the provision of physical infrastructure. We also do not think this is material evidence in support of finding SMP for any other infrastructure provider.

5.25 For these reasons, we have decided that existing alternative infrastructure is unlikely to exert a material constraint on BT, and that this situation is unlikely to change over the period of this review.

Scope for entry and expansion

5.26 In Section 1 and Annex 3 we describe the significant activity in deploying new networks, or expanding existing networks, currently underway in the UK. We anticipate these and potentially other builds to be rolled-out during the period of this review.

5.27 However, we do not expect this significant network build activity to translate into the extensive construction of new telecoms physical infrastructure suitable for use by other access seekers.

5.28 Entry into the market for constructing this kind of physical infrastructure to support large-scale roll-out would require very high levels of investment, a large proportion of which are likely to be sunk costs, and which would take a considerable period of time to deploy. We therefore consider that, in general, there are high entry barriers to constructing new physical infrastructure.

5.29 What we understand from what network operators have told us, is that their build plans are dependent on:

- wholesale access to BT's existing physical infrastructure via the existing PIA remedy (and so is not relevant under a modified greenfield approach); and/or
- where practical, the use of faster and more efficient construction techniques, such as micro-trenching, which may not be suitable for use by access seekers (so this entry could therefore only exert an indirect constraint on BT).

5.30 We consider the dependence on these alternatives to be a reflection of the high barriers facing potential entrants to the infrastructure market.

[380] See Sections 3 and 4 for our explanations as to why we think other networks provide a weak constraint.

5.31 Deployment of some new infrastructure is nevertheless expected. There will be parts of network builds where this is either necessary or the above alternatives are not available. But we expect such entry to be geographically limited in scale and so is unlikely to place a sufficient constraint upon BT.

5.32 For these reasons, we have decided that the threat of entry or expansion by new or existing operators would not effectively constrain BT.

Countervailing buyer power

5.33 In general, purchasers may have a degree of buyer power where: a) they purchase a significant and material proportion of a supplier's total volumes; and b) they have a credible threat of switching to an alternative supplier, or to self-supply, to an extent that would materially impact the supplier's profitability.

5.34 Currently, the largest user of BT's physical infrastructure is BT itself, and other providers do not currently purchase a significant amount of access. Furthermore, BT's involvement downstream weakens its incentive to offer supply of its infrastructure at scale, absent regulation. Even if it did, should an access seeker purchase significant volumes of access to infrastructure, it is unlikely that there would be a credible threat of it switching sufficient volumes away quickly, given the large switching costs and service disruption that would be involved in removing and re-deploying its network in alternative physical infrastructure. It is also unclear that an alternative provider would be willing to supply access to its infrastructure in such volumes.

Finding on SMP

5.35 For the reasons given above we have found that BT has SMP in a national market for the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network. Therefore, we are making a market power determination to this effect.

Competition concerns arising from BT SMP in access to telecoms physical infrastructure

5.36 Having decided that BT has SMP in the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network, we now consider the consequences of this SMP.

5.37 Physical infrastructure is a key enabler of the provision of telecoms services – both in terms of the deployment of new telecoms networks as well as innovation in existing networks. This is because the civil engineering works associated with the deployment of physical infrastructure represent a sizeable proportion of the cost and time to deploy, and therefore a barrier to new network investment on a large scale.

5.38 As a vertically integrated provider, BT's access to its physical infrastructure provides it with a significant commercial advantage in the provision of all telecoms services in the UK (excluding the Hull Area). This advantage can be seen in the enduring SMP BT continues to

maintain in key downstream wholesale services (and would enjoy in the retail services absent regulation).

5.39 Access to ubiquitous telecoms physical infrastructure appears to offer BT the advantage of the lowest cost delivery path for new network installation and network upgrade, such that it can sustain and, in some cases, reinforce its SMP in downstream services. Specifically, it provides BT with the following advantages in the construction of, and innovation in, telecoms physical infrastructure and the provision of downstream telecoms services:

- **cost**: BT can deploy new fibre networks with a cost advantage of up to 50% in upfront costs;[381]
- **coverage and speed of provision**: BT can provide new network links more rapidly than competitors as the ubiquity of its network significantly reduces the need for the construction of new physical infrastructure; and
- **innovation**: BT's flexible physical network provides capacity to construct new network or reconfigure networks more rapidly and at lower costs and with less risk than competitors.

5.40 In the absence of regulation there are behaviours that BT could engage in that could distort downstream competition:

- it could refuse to supply access to its physical infrastructure, and thus continue to restrict competition in the provision of products and services in downstream markets;
- it could provide access on less favourable terms compared to those obtained by its own downstream businesses; and
- it could set excessive wholesale charges for access to its physical infrastructure or engage in price squeeze behaviour.

5.41 As discussed in Section 4, we consider that while competition law enforcement may be used in appropriate circumstances, we do not consider that it would be sufficient to rely on it alone and that *ex ante* regulation is required.

5.42 We consider in Volume 3, Section 4 how to address these competition concerns.

[381] 2019 PIMR Statement, page 57, paragraph 3.225.

6. Product market definition for wholesale network services

6.1 In this section we review the markets for wholesale network services, specifically for the provision of broadband, leased lines and inter-exchange connectivity services.

6.2 Consistent with the legal framework (see Annex 1), the exercise is a forward-looking assessment, taking into account expected or foreseeable developments that may affect competition in the market over the period of the review. This includes developments in technology, regulation and demand. In this review we are looking forward to March 2026.

6.3 In reviewing these markets, we take into account the remedies we have decided to impose in the upstream telecoms physical infrastructure market in Volumes 3 and 4, based on the SMP findings set out in Section 5. This means that the downstream wholesale markets would only be subject to *ex ante* regulation if competition issues remain, despite the presence of regulation on the upstream market. We also assess each downstream market assuming that no SMP regulation exists in that particular market. This avoids the risk of circularity in our assessment – i.e. a finding of no SMP in a market which is predicated on pre-existing *ex ante* regulation of that market.

6.4 In the January 2020 Consultation we considered whether there was a case for defining a single product market for wholesale access services. We anticipated increasing competitive interaction across services and a similarity in competitive market conditions. We noted that a single product market definition would recognise the importance of competition between networks providing both broadband and leased line services in driving the transition to fibre, exploiting strong economies of scope in the provision of mass-market broadband and dedicated high capacity services to residential and business customers, and a likely blurring of the boundaries between the demand for leased line and broadband services.[382] We recognised, however, that the emergence of competition will take time and that we had previously found material differences in competitive market conditions between the supply of leased line and broadband products in central London and some other business districts.

6.5 We therefore proposed to define separate wholesale local access (WLA) and leased line access (LL Access) product markets, but considered the competitive interactions between services to be an important consideration in determining remedies.[383] Our view remains that it is appropriate to maintain separate WLA and LL Access product markets.[384]

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[382] Ofcom, 2018. *Promoting investment and competition in fibre networks – approach to geographic markets consultation*, paragraph 1.7.

[383] In response to the January 2020 Consultation, BT (see BT Group response to January 2020 Consultation, paragraph 2.73) and Gigaclear (see Gigaclear response to January 2020 Consultation, paragraph 39) both agreed with our proposal to define separate broadband and leased line wholesale access market, but also agreed that the distinction between WLA and LL Access is blurring with the move to fibre.

[384] We note that this approach is consistent with the markets listed in the 2020 EC Recommendation, to which we may have regard.

6.6 In summary, we define three product markets:

a) a product market for the supply of WLA at a fixed location;

b) a product market for the supply of LL Access; and,

c) a product market for the supply of inter-exchange connectivity (IEC) services.

Product market definition for WLA

6.7 In this section we set out our decisions in relation to product market definition in WLA services.

6.8 In the January 2020 Consultation we proposed to define a single WLA product market that:

a) included all fixed networks;

b) included all speeds;

c) included residential and business services; and

d) excluded leased line and wireless services.

6.9 Demand for WLA is derived from consumers' retail demand for different products. We noted that we had previously defined WLA as access to network assets used by a retail telecoms provider to deliver a range of differentiated services and bundles to residential and business customers at a fixed point close to the end user. These services include:

a) broadband;

b) the ability to receive TV content; and

c) the ability to make and receive voice calls.

6.10 We said that although multiple services can be provided over a local access connection, the key supply requirement is the local access connection itself. Once a connection is in place, a range of services can be supplied. Of the retail services listed, the most important is broadband.

6.11 We used the standard approach to market definition to support these findings. Our approach was to first define the 'focal product', and second consider the degree to which possible alternative products exert a competitive constraint on the focal product.[385] Our focal product was the supply of WLA services by fixed networks to support the delivery of broadband services to residential and business customers. This focal product included all broadband speeds and included networks using different technologies. We then considered whether leased line services, mobile phone networks and wireless technologies posed strong constraints on fixed broadband. We concluded that they did not.

[385] As is standard, we adopt the 'hypothetical monopolist' framework, in which we ask whether a hypothetical monopoly supplier of the focal product would (if unconstrained by regulation) choose to set prices above the competitive level, or whether the presence of alternatives would keep prices at competitive levels.

6.12 CityFibre[386] and Gigaclear[387] agreed with our proposed product market definition.

6.13 No stakeholders argued that LL Access services should be included in the WLA product market. CityFibre,[388] Gigaclear[389] and TalkTalk[390] agreed that wireless technologies did not exert a strong constraint on fixed broadband. BT Group agreed with this in relation to fixed wireless services, but said we had given insufficient weight to the latest developments in meshed network and satellite technologies and the competitive constraints these technologies will likely impose on ultrafast pricing over the review period.[391]

6.14 The main issue raised in responses were suggestions that we should have started with a narrower focal product, distinguishing between different bandwidths (BT Group, Openreach) or different technologies (Talk Talk).[392] As we explain in more detail below, we do not agree. In our view, the essential competitive dynamics in fixed connections are best captured by the physical connection itself. Once the physical connection is in place it can be used and adapted to compete to attract customers across the range of fixed broadband services. At present, and during the course of this review period, all of the major technologies (FTTC, FTTP and DOCSIS) can and do supply the full range of products that most customers currently want to purchase. Demand for higher bandwidths will grow, and the legacy copper network will become less able to supply customer needs. However, in anticipation of these future developments, Openreach is replacing copper with full fibre so that it can compete effectively as demand evolves.

6.15 Vodafone initially argued that WLR and MPF are in the same market on the basis that both products are technically similar and perform a near identical purpose.[393] It subsequently set out its view that where WLR is used as a bearer to deliver broadband, it is in the WLA market.[394] We include sales of broadband that use the WLR product in our evaluation of Openreach's WLA market power.[395] This makes no difference to our assessment of Openreach's WLA market power.[396]

6.16 We find that the relevant market is that proposed in our consultation: WLA for the supply of broadband at a fixed location.

6.17 We discuss the following issues in more detail below:

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[386] Cityfibre response to January 2020 Consultation, paragraphs 3.38 and 3.39.
[387] Gigaclear response to January 2020 Consultation, paragraphs 39 to 42.
[388] CityFibre response to January 2020 Consultation, paragraph 3.24.
[389] Gigaclear response to January 2020 Consultation, paragraph 22.
[390] TalkTalk response to January 2020 Consultation, paragraph 4.29.
[391] BT Group response to January 2020 Consultation, paragraphs 2.62 and 2.63.
[392] BT Group response to January 2020 Consultation, paragraphs 2.39 to 2.42; Openreach response to January 2020 Consultation, Section 2; and TalkTalk response to January 2020 Consultation, Section 4.1.
[393] Vodafone response to January 2020 Consultation, Part 1, Paragraph 3.12.
[394] Letter from [✂] (Vodafone) to Lindsey Fussell (Ofcom), 5 February 2021, https://www.ofcom.org.uk/__data/assets/pdf_file/0031/213979/vodafone-wlr-response.pdf.
[395] WLR is downstream of the WLA layer, but we treat WLR supplied premises as a form of self-supply by Openreach based on WLA.
[396] See Section 9.

a) our choice of focal product, and why we do not think it is right to subdivide by broadband speeds or network technologies;

b) analysis of constraints from possible substitutes for the retail services (mobiles, fixed wireless access or leased lines) supplied using the focal product; and

c) our conclusion on wholesale product market definition.

Choice of focal product

6.18 In the January 2020 Consultation we proposed to define the focal product to be the supply of WLA services by fixed networks to support the delivery of broadband services to residential and business customers. We noted that this followed the approach taken in previous reviews in recognising the economies of scope inherent in supplying multiple downstream broadband services from a single access connection.

6.19 CityFibre[397] and Gigaclear[398] agreed with the definition of a single focal product. However, Vodafone argued that standard broadband services constitute a separate market. BT Group and Openreach argued that speeds up to 100Mbit/s are in a separate market than faster speeds. TalkTalk argued that Ofcom should adopt a technology-based approach and that this would result in a separate product market comprising either FTTP-only or FTTP and DOCSIS.

6.20 We discuss below the reasons why we do not consider it appropriate to further subdivide the focal product.

Different broadband speeds

6.21 In the January 2020 Consultation we considered that both supply-side and demand-side factors pointed to a single WLA market that is not differentiated by broadband speeds. Accordingly, we proposed to define a single WLA focal product that is undifferentiated by speed.

6.22 On the supply-side we noted that local access networks are typically built with capability to support the delivery of a range of broadband speeds, and that Virgin Media and new entrant networks will all have the capacity to provide a full range of broadband speeds. Openreach's FTTC network currently covers over 95% of the UK and can offer a range of speeds up to 80Mbit/s, and it is upgrading its network to fibre.

6.23 Looking forward, we observed that fibre networks will exhibit the same economies of scope as legacy networks and that, having built fibre networks, operators will have a strong incentive to serve the whole of the market including demand for lower and higher bandwidth services.

[397] Cityfibre response to January 2020 Consultation, paragraph 3.38 and 3.39.
[398] Gigaclear response to January 2020 Consultation, paragraphs 39 to 42.

6.24 We recognised that the new networks could offer better quality services, but considered that differentiation between networks, and the retail services that they support, could be addressed in later stages of the analysis.

6.25 BT Group argued that because Openreach's network is currently limited to the supply of speeds of up to 80Mbit/s, it does not constrain ultrafast on the supply-side.[399]

6.26 We recognise that Openreach's existing FTTC network cannot supply higher speeds than 80Mbit/s. However, the evidence is that over this review period most customers will not require higher speeds (see Section 2). This means that Openreach will have the capability to deliver services that most people want over the period of the review. Openreach has the capability to offer the full range of fibre broadband speeds wherever it deploys FTTP, and that footprint is growing. By the end of the review period, Openreach expects to have deployed FTTP network to pass around two-thirds of UK premises.[400]

6.27 That Virgin Media currently has the capability to offer faster speeds than Openreach is not a new feature of the market.[401] This has been reflected in competitive dynamics with Virgin Media differentiating its offering to target customer groups with a higher willingness to pay. What we expect to see over the review period is an erosion of this differential as Openreach continues to roll out FTTP.

6.28 Any competitive advantage that Virgin Media and new networks may have will be limited to a period during which most people do not subscribe to ultrafast services. We recognise that demand is growing for higher speeds (see Section 2) but the evidence is that Openreach will be well placed to accommodate this growing demand. Openreach's FTTP presence is today substantially larger than that of all the new networks taken together and information on build plans suggests that this will remain the case. Forecasts provided by ISPs show the volume of connections offering speeds of more than 80Mbit/s delivered on the Openreach network increasing consistently over the period of the review.

6.29 We therefore maintain our view that defining a single focal product reflects the nature of competition in the WLA market (i.e. that networks, and ISPs that they support, are competing with each other across a range of product features and are evolving over time). We consider that any differentiation between networks in the range and quality of services that they can support is correctly considered in the SMP assessment.

6.30 Overall, our view therefore remains that supply-side considerations point to a single market undifferentiated by speeds. However, for completeness we also consider whether demand-side considerations provide further support for defining a single product market.

Evidence on demand-side substitutability

[399] BT Group response to January 2020 Consultation, paragraphs 2.39 to 2.42.
[400] To the extent that faster speeds are expected to be required sooner, Openreach has the option of deploying G.Fast technology nearer to the end-customer (see Annex 2) to deliver even faster speeds using the copper network.
[401] Virgin Media's network has until recently supported speeds of up to 516MBit/s and is currently being upgraded to allow speeds of 1Gbit/s. See Annex 2 for more detail.

6.31 In the January 2020 Consultation we considered whether different speeds were good substitutes for consumers, specifically between (a) standard broadband services and superfast broadband (SFBB)[402]; (b) different SFBB speeds; and (c) SFBB and higher speeds. The main sources of evidence were survey and other research carried out by ISPs, our discussions with ISPs, and our analysis of retail and wholesale market pricing. The evidence suggested that:

a) There is a low willingness to pay for high bandwidth services.

b) Consumers are taking higher speed services, but mainly moving from standard broadband to superfast broadband speeds of less than 100Mbit/s, not to the highest speeds.

c) Much of the upgrading that is occurring is driven by suppliers, often offering speed upgrades at zero charge, rather than reflecting strong demand from consumers. Openreach has supported this process using wholesale pricing deals.

d) Evidence on pricing is complex, because broadband is often offered in bundles with other retail services and there can be significant differences between in-contract and out-of-contract customers. But the general picture is one of significant pricing overlap between speeds, and no large "break" in prices.

e) By the end of the period speeds below 300Mbit/s will continue to predominate. Standard broadband will decline to low levels, supporting our view that while higher speeds constrain prices for standard broadband, standard broadband is in decline as a constraint on higher bandwidth prices.

6.32 In response to the January 2020 Consultation, BT Group[403] and Openreach[404] stated that our arguments in relation to the take-up of faster services did not necessarily support a single market. BT Group also said that further work was needed to determine whether substitution between superfast and ultrafast services at the retail level creates an indirect constraint that would effectively constrain a hypothetical monopolist of ultrafast capable lines.[405]

6.33 Openreach acknowledged that the take-up of access connections at ultrafast speeds is relatively low at present and that the majority of lines purchased by end-customers will be at maximum speeds no higher than the 300Mbit/s threshold by 2026. Openreach's view is that this does not necessarily imply there is not and will not be a distinct market for ultrafast connections.

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[402] Standard broadband was defined to be speeds of less than 30Mbit/s and SFBB to be speeds in range of 30Mbit/s to less than 300Mbit/s.

[403] BT said that Ofcom's argument that current ultrafast prices may be deterring mass-market take-up does not imply a single market as it could instead suggest that ultrafast prices are not currently constrained by slower speeds (see BT Group response to January 2020 Consultation, paragraphs 2.39 to 2.42).

[404] Openreach response to the January 2020 Consultation paragraph 2.41

[405] BT said that the required analysis would have a number of elements including: wholesale gross margins; the ratio of wholesale prices to retail prices; the extent to which wholesale prices are passed through to retail prices; and whether retail demand for ultrafast capable lines is sufficiently price elastic.

6.34 Since the January 2020 Consultation we have updated this evidence. The findings are set out in detail in Section 2. We consider that this further evidence confirms our earlier findings.

Are standard and SFBB speeds in the same market?

6.35 In the January 2020 Consultation we found that around a third of people are subscribing to standard broadband services, but indicative forecasts suggested that this could fall to around one million by 2026. We said that we understood BT had stopped offering standard broadband services to new customers and noted that neither Virgin Media nor Hyperoptic were advertising standard broadband products. We also noted that Virgin Media had automatically upgraded its standard broadband customers, and [✂] and [✂] were offering free of charge upgrades motivated by both Openreach pricing and the opportunity to reduce churn.

6.36 Looking forward, we recognised that the competitive constraint exerted by the availability of cheaper standard broadband services on SFBB services was likely to become increasingly weak, but considered that the continued availability of cheaper standard broadband services would continue to exert some constraint on SFBB prices and vice versa.[406] We therefore proposed to consider standard broadband services as part of the WLA market.

6.37 Since our January 2020 Consultation, the number of people subscribing to standard broadband services has continued to fall,[407] and indicative forecasts still suggest that this could fall to less than 5% of all broadband connections by the end of review period. We have also found Vodafone is not advertising products at these speeds.[408]

6.38 In response to the January 2020 Consultation, Vodafone said that given the increasingly weak substitutability of lower speed connectivity for higher speeds, it is no longer appropriate to classify standard broadband and SFBB within the same market.[409] We recognise that the constraint standard broadband prices exert on prices for higher speed products would likely weaken over the period of review. However, with around a quarter of customers still subscribing to standard broadband products and the evidence on their low willingness to pay for faster services (see Section 2), we consider that the desire of networks to migrate these customers to faster speeds means that the prices of standard broadband products continue to exert some competitive constraint.

Are different SFBB speeds in the same market?[410]

6.39 In our January 2020 Consultation, we set out evidence that people had a low willingness to pay for higher broadband speeds. Several factors appeared to be contributing to this, including high levels of consumer satisfaction with current broadband speeds, a lack of

[406] As of 14 February 2021, Plusnet offered 10Mbit/s broadband package at £18.99 a month, EE at 10Mbit/s package at £22.50 a month and Sky a 11Mbit/s package at £25 a month.
[407] See: Ofcom, 2020. *Telecommunications Market Data Update Q2 2020*, Table 16.
[408] As at 14 February 2021
[409] Vodafone response to January 2020 Consultation, Part 1, paragraph 3.13.
[410] In the January 2020 consultation, we defined lower SFBB speeds to be those from 30Mbits up to 100Mbit/s and higher SFBB speed to those from 100Mbit/s up to 300Mbit/s.

awareness of current broadband speeds, and poor understanding of the benefits of fibre. Further evidence that these customers would not be prepared to pay a large premium for higher speeds was provided by: Openreach's wholesale access charges for its 40/10 and 80/20 products, the fact that BT was no longer offering standard broadband to new customers where FTTC/FTTP services are available, and the upgrading of BT customers to 80/20 products at no additional cost.

6.40 We also noted that higher speed broadband services are often bundled with other premium services (an example is Virgin Media's 'Ultimate Oomph' package). The strategic advantage for ISPs of bundling services in this way is that the same bundle could be attractive to people with different willingness to pay for different components of the package. In choosing between bundles, end-customers will consider the range of features before deciding whether a retail tariff is value for money. In these circumstances, packages offering lower broadband speeds may be a closer substitute for premium products for some customers than may be indicated by retail price differentials. We observed a significant overlap in the features and prices of packages available in the market and consider that ISPs have considerable flexibility in the design of packages and positioning of packages in the market.

6.41 The evidence remains that most people have a low willingness to pay for higher broadband speeds, that speeds of less than 100Mbit/s are more than adequate to meet their needs, and levels of consumer satisfaction have been maintained over the course of the Covid-19 pandemic (see Section 2).

6.42 The evidence also remains that most people will continue subscribing to SFBB services (see Section 2). These results, combined with information provided by our review of internal documents, indicate that competition will remain focussed on attracting customers to SFBB products and then encouraging them to upgrade, and that networks will have to offer attractive prices to achieve this (see Section 2).

Are SFBB and UFBB speed in the same market?

6.43 In our January 2020 Consultation, the evidence pointed to there being a small proportion of users who would be prepared to pay a substantial premium for even 1Gbit/s broadband services. It was, for example, clear from internal documents that ISPs were experimenting with different approaches to the design, marketing and pricing of their retail products. Looking ahead, indicative forecasts suggested that by 2026 the majority of people would be subscribing to SFBB services with 20% subscribing to UFBB services,[411] and the evidence was that the prices charged would need to be attractive to achieve this level of penetration.

6.44 The evidence remains that only a small proportion of users will be prepared to pay a substantial premium for 1Gbit/s broadband services (see Section 2). It remains clear from internal documents that ISPs are continuing to experiment with different approaches to the design, marketing and pricing of their retail products. For example, [✂] have carried

[411] Where we defined UFBB to be speeds of 300Mbit/s and above.

out exercises exploring various approaches to attracting more customers, and then 'moving customers up the ladder'. The findings of these exercises were that their commercial objectives were best achieved with small increments in prices for products across the range of speeds, with larger premiums for only the highest speeds (500Mbit/s and higher).

6.45 BT Group noted[412] Virgin Media's statement that the commercial case for wholesaling increases as it is overbuilt with full fibre as further evidence of the demand for FTTP based services.[413] In particular, they said that if Virgin Media was already effectively constrained by the presence of superfast, then competition from full fibre networks should not make a significant difference to their conduct. The implication of this argument is that FTTP based services are a stronger threat to Virgin Media than FTTC-based services. We consider that this may be the case. However, the main impact seems likely to occur in the future once the Openreach FTTP network is constructed, and we agree that speeds will grow in importance over time. Moreover, an element of quality differentiation does not lead to separate markets.

6.46 In response to the January 2020 Consultation, Openreach acknowledged that the majority of end-customers will have maximum speeds no higher than 300Mbit/s by 2026. Openreach's view, however, is that this does not necessarily imply there is not and will not be a distinct market for such ultrafast connections as, where such services are available, demand from early adopters is driving a willingness to pay a premium and such early adopters are less likely to switch back to slower speeds. Also, the pool of individuals seeking ultrafast speeds and the value they place on such speeds will only grow over time as demand for bandwidth-hungry services and applications grows.

6.47 We do not disagree that there may be a growing number of people who are prepared to pay a premium for ultrafast services. However, networks will be competing to attract customers offering a range of products and will want to attract the majority of customers who are not prepared to pay a premium. Also, the availability of lower speeds at lower prices will be a constraint on the take-up of higher speeds, and if networks are to achieve higher levels of penetration they will have to offer attractive prices.

BT Group arguments

6.48 BT Group said that we should carry out a SSNIP test[414] in which we would determine whether an attempt by a hypothetical monopolist offering broadband speeds of 100Mbit/s and faster would be frustrated, on the demand-side, by people switching to other networks providing slower speed services, or on the supply-side by other networks starting to provide the faster speed services. BT Group submitted a report prepared by Compass Lexecon, which provided an illustrative example of a SSNIP test. However, Compass Lexecon stated that the numbers chosen were illustrative, and did not present an

[412] BT Group response to January 2020 Consultation, paragraph 2.41.
[413] We consider arguments related to the potential competitive threat from Virgin Media wholesaling in Section 8.
[414] SSNIP stands for small but significant non-transitory increase in price. In applying this test, we would consider whether an attempt by a hypothetical monopolist of UFBB services to increases prices above the competitive level would be frustrated people switching to slower speed (or not upgrading to faster speeds).

evidence-based submission that pointed to a lack of demand side substitutability. Compass Lexecon suggested that we should have commissioned a survey to investigate whether customers would switch (or not upgrade) in response to change in relative prices of different broadband speeds. Compass Lexecon said there is evidence that once customers are on ultrafast they are reluctant to switch back to slower speeds.[415]

6.49 Our comments on this are:

a) The information provided by our extensive review of surveys and research carried out by the networks and service providers suggests a high degree of substitutability between bandwidths (see Section 2).

b) Failure to recognise the economics of fibre networks in applying a SSNIP test could result in an overly narrow market definition.[416] This is because any network operator must achieve good levels of penetration to be sustainable and must, therefore, offer products at prices that would be attractive to a mass-market customer base as well as to people prepared to pay for higher prices for premium products.[417]

c) In a dynamic setting, an attempt to raise prices could be frustrated not just by people downgrading, but also by people who might otherwise have upgraded, not doing so.

d) As BT itself recognises,[418] its demand-side arguments will be stronger in future review periods. We will revisit our market analysis in future reviews.

6.50 BT Group also said that wholesale demand is more likely to be driven by ISPs seeking long-term agreements that will support them in establishing retail positions in the provision of ultrafast-capable lines and network operators seeking deals to support their costly and risky investments in ultrafast networks.[419] Openreach also said that, even if we concluded that end-customers have limited demand and willingness to pay no more than a modest premium for ultrafast speed connections today and over the course of this review, there is clear evidence that ISPs see commercial benefits to purchasing ultrafast-capable connections where these are available. Furthermore, the pressure on new networks to secure long-term deals with ISPs to support their investment, is an opportunity to secure

[415] Compass Lexecon, 2020. *Review of Ofcom's approach to assessing ultrafast market power: A note prepared on behalf of BT* (Compass Lexecon Report), paragraphs 3.15 and 3.23.
[416] The risk of this in dynamic settings has been recognised in other sectors, for example, in 'innovation market' contexts. This is illustrated by the following quotation: "*the tools for assessing capabilities may not be well developed yet, but they are developed enough to allow tentative application. Clearly product market analysis can be unhelpful and misleading in dynamic contexts. Using the right concepts imperfectly is better than a precise application of the wrong ones.*" David Teece in Alexiadis & de Streel, 2020. *Designing and EU Intervention Standard for Digital Platforms.*
[417] The evidence is that gigabit capable networks will be competing across a range of services, offering competitively priced mass market products and then encouraging people to upgrade to faster services. For example, Virgin Media offers a range of products including products offering speeds of around 100Mbit/s and 500Mbit/s while CityFibre provides a single competitively priced 1Gbit/s wholesale product leaving it to ISPs to differentiate retail services.
[418] BT Group said in its discussion on market definition that the review period will be a time of change as the market shifts to ultrafast services (see BT Group response to January 2020 Consultation, paragraph 2.1). Also, taking a forward-looking view of the elasticity of demand, there is that evidence that once on ultrafast customers are reluctant to switch back to slower speeds (see Compass Lexecon Report, paragraphs 3.15 and 3,23).
[419] BT Group response to January 2020 Consultation, paragraph 2.41.

attractive prices even if end customers do not have clear demand for the higher speeds that can be supported by those networks.[420]

6.51 We consider that these arguments support defining a single focal product. This is because the argument is that demand for ultrafast services (specifically expectations in relation to future demand for ultrafast services) is impacting on competitive market conditions today in the wholesale supply of all broadband speeds. In addition, we consider that the impact of the move to fibre on the negotiating position of ISPs in their dealings with Openreach is a factor to be considered in the SMP assessment.

6.52 Accordingly, it remains our view that both supply and demand side considerations point to defining a single focal product undifferentiated by speed.

Networks

6.53 In the January 2020 Consultation, we recognised that over the period of the review retail services would continue to be delivered over a mix of fixed networks using different technologies. We noted, however, that the range of retail services and packages delivered over these different types of networks have similar features, with new networks able to offer improved quality. Looking forward, we said that the economies of scope inherent in fibre and upgraded DOCSIS networks meant that, having built high capacity networks, operators of these networks would have a strong incentive to serve the whole of the market (i.e. both lower and higher bandwidth services). For these reasons, we concluded that retail services delivered over the new networks should be good substitutes for those delivered over the existing networks.

6.54 In response to the January 2020 Consultation, TalkTalk said that we should adopt a-technology-based approach and that this would result in a product market comprising either FTTP-only or FTTP and DOCSIS.[421] TalkTalk also said that we had not considered factors such as quality of service and future proofing, and the potential for retail providers to transfer a large volume of customers from one network to another in a relatively short space of time as the major drivers of competition between networks.[422]

6.55 In the January 2020 Consultation, we recognised that the upgraded DOCSIS network and the new FTTP networks could offer faster speeds and better-quality services than Openreach's FTTC and copper networks. We considered above the case for defining a focal product differentiated by speed, concluding that in this review period we should include all speeds in the focal product. We also explained in the January 2020 Consultation that differentiation between different networks in relation to both the range or quality of the services that they can support is not sufficiently large to suggest separate markets and is better considered in the SMP assessment. The ability of ISPs to transfer large volumes of customers is considered in the SMP section under the assessment of countervailing buyer power. Market definition is the first step in the market assessment framework, and what

[420] Openreach response to January 2020 Consultation, paragraphs 2.37 – 2.51.
[421] TalkTalk response to January 2020 Consultation, paragraph 4.10.
[422] TalkTalk response to January 2020 Consultation, paragraph 4.25

matters is that we consider all the relevant issues in the overall process. Our view is that we do take account of the differences between the networks in relation to the range and quality of broadband services that they can support, albeit at a different stage of the market assessment analysis from that suggested by TalkTalk.

Residential and business customers

6.56 In the January 2020 Consultation, we recognised that there are business-grade broadband services offering additional services and features compared with residential services at higher prices.[423] However, we found that the additional features of business grade broadband are generally not a feature of WLA services, but are a result of downstream activities. This means that the wholesale products supporting business and residential broadband connections are the same. We also found that, on the demand-side, non-business grade broadband services are sufficient to meet the needs of many businesses.[424] Looking forward, the move to fibre may provide greater opportunity for providing enhanced broadband services aimed at business customers, but increased reliability could also see more businesses switching to non-business grade products.

6.57 For these reasons, we proposed not to distinguish between business and residential customers in the definition of the focal product. We did not receive any responses to the January 2020 Consultation disagreeing with this proposal. Accordingly, this remains our position.

6.58 Overall, it remains our view that the definition of our focal product should include all fixed networks we expect to be supplying WLA services over the review period.[425]

Leased lines as a substitute for broadband

6.59 In the January 2020 Consultation, we proposed not to include leased line services in the WLA product market.

6.60 On the demand-side, we recognised that business grade broadband services could be an alternative for some users to leased line services. We noted, however, that over the period of this review, broadband and leased line products would continue to have distinct features, and that leased line services provide end-users with a higher quality service at substantially higher prices.[426] We, therefore, considered it most unlikely that many businesses would consider leased lines and broadband services to be close substitutes.

6.61 On the supply-side, we considered the potential for networks currently providing only leased line services to be supply side substitutes. We concluded that a leased line only

[423] See Section 2 for some examples of how features of business and residential products compare.
[424] Historically around 30% of SMEs subscribed to residential broadband services
[425] Including WLA services self-supplied to a downstream business.
[426] For example, we looked at BT website (business.bt.com) advertised prices for BT products aimed at SME customers as at 3 February 2021 . We found advertised prices for broadband-based products offering download speeds of 76 Mbit/s to range from £29.95 to £72.45 a month. This compared with advertised price for a leased line offering speeds of 50 Mbit/s from £195 a month and 100 Mbit/s from £340 a month.

network operator would not have the network architecture or operational capability required to provide broadband services.

6.62 For these reasons, we proposed not to include leased line services in the WLA market. We did not receive any responses to the January 2020 Consultation disagreeing with this proposal. Accordingly, it remains our view that leased line services should not be included in the WLA product market over the review period.

Wireless technologies

6.63 In the January 2020 Consultation, we proposed not to include wireless technologies - specifically fixed wireless, mobile, and satellite services - in the product market.

6.64 We considered it unlikely that wireless technologies would be used to supply sufficiently large numbers of customers to generally compete with fixed services. While there were some differences between technologies in the reasons for this, we found that the retail services provided were likely to be less attractive to customers than those provided using fixed access services. For satellite services it remained early days.

6.65 We recognised that 5G promised to offer much higher speeds and fewer restrictions on data usage, but we considered it too early to assess how the quality of 5G services will compare with fixed broadband or what the packages will look like, as 5G networks are rolled out and services mature.

6.66 CityFibre[427], Gigaclear [428] and TalkTalk[429] agreed with our proposed position. BT Group agreed that FWA services do not fall within a fixed (wired) broadband market, but said that we had given insufficient weight to the latest developments in meshed network and satellite technologies and the competitive constraints these technologies will likely impose on ultrafast pricing over the next review period.[430] We did not receive any other comments disagreeing with our proposal not to include wireless technologies in the WLA product market.

6.67 Since the January 2020 Consultation, we have updated our analysis of the features and availability of wireless services (see Annex 2) including developments in meshed FWA networks using, for example, Facebook's Terragraph technology. But we have not identified any compelling evidence to suggest that fixed wireless access will, over the period of the review, exert a material competitive constraint on fixed access services.

6.68 Our view therefore remains that while this is an area that could develop during this market review, we do not consider that wireless technologies exert a sufficient constraint on WLA to include them in the relevant product market. We consider whether wireless services act as an external constraint in our SMP assessment.

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[427] CityFibre response to January 2020 Consultation, paragraph 3.24.
[428] Gigaclear said that FWA dependence on fixed infrastructure means that it will often be of limited use as a scalable alternative physical infrastructure. Also, based on their experience, that FWA is best suited to connecting across short distances across complex terrain (see Gigaclear response to January 2020 Consultation, paragraph 22).
[429] TalkTalk response to January 2020 Consultation, paragraph 4.29.
[430] BT Group response to January 2020 Consultation, paragraphs 2.62 and 2.63.

Conclusion on product market definition for WLA

6.69 Based on the analysis set out above, we define a single market for WLA services which:

a) includes services at all bandwidths;

b) includes broadband access services provided by networks deploying mixed copper/fibre, cable and full-fibre technologies;

c) Includes services supporting both residential and business broadband connections;

d) excludes leased line access services; and

e) excludes retail provision of broadband services delivered over networks deploying wireless technologies.

Product market definition for LL Access

6.70 In this section we set out our decisions in relation to product market definition for LL Access services.

6.71 Leased lines provide high quality point-to-point business connectivity services between two or more locations. These services tend to be symmetric (the capacity is the same in both directions), uncontended (the capacity is guaranteed and not subject to reduction by the presence of other telecoms services), and typically, dedicated. These are different from other services such as consumer and business broadband connections which tend to be contended.

6.72 Leased lines can be provided using fibre-based Ethernet and WDM technologies, both of which can meet different customer capacity requirements to connect to customer sites[431].

6.73 We define LL Access services as dedicated circuits between end-user sites and the first point of aggregation, or in some cases, a dedicated connection between end-user sites.

Our proposals

6.74 We proposed to define a single market for LL Access services at all bandwidths and including dark fibre. In summary, our proposed findings on the key issues in defining the relevant product market were:

- Different bandwidths of LL Access services are in the same product market because supply conditions are similar. Dark fibre is also a substitute.
- Other access services, such as broadband and Ethernet in the first mile (EFM), should not be considered in the same product market as LL Access services.
- There is a single market for all access customers and, in particular, we consider that mobile backhaul services form part of the LL Access market.

[431] See Section 2 for a description of the different products

- LL Access services and IEC services are in different markets.

Stakeholder responses

6.75 We did not receive many comments on our proposed LL Access product market definition in response to the January 2020 Consultation.

6.76 BT Group suggested that, in future reviews, there might be a case for defining services offering speeds at a below 1Gbit/s to be a separate market from those offering speeds of more than 1Gbit/s.[432] TalkTalk[433] said that we had not considered asymmetries in constraints which would lead to the definition of a separate dark fibre product market. [434] CityFibre[435] and euNetworks[436] did not agree that competitive market conditions are similar in the provision of LL Access services for enterprise and mobile backhaul. Three[437] raised some similar points.

6.77 We comment on these stakeholder responses below.

6.78 Before doing so, we first address an issue that has arisen in relation to a particular use case for leased lines, following Openreach's introduction of new charges for leased line circuits being used to aggregate FTTP to multiple premises. We have been asked by several stakeholders to clarify whether leased line circuits between a BT exchange and FTTP cabinet, being used to aggregate FTTP to multiple premises, would fall within the market for LL Access.[438] As noted above, we define LL Access circuits as dedicated circuits between an end user site and the first point of aggregation (or in some cases between end user sites). If a particular use case meets this definition, then it will form part of the LL Access market.

6.79 Whether this particular use case meets the definition will depend on whether a FTTP cabinet is viewed as an end-user site. In our view, an end-user site is not limited to buildings (residential premises, offices etc), but could also include a FTTP cabinet nominated by a wholesale customer. For example, we consider connections between BT exchanges and mobile base stations to form part of the LL Access market. We consider this issue further in Volume 3, Sections 5 and 6.

Speeds

Our proposals

[432] BT Group response to January 2020 Consultation, paragraph 2.74.
[433] TalkTalk response to January 2020 Consultation, Section 7.2.
[434] TalkTalk response to January 2020 Consultation, Section 7.2.
[435] CityFibre response to January 2020 Consultation, paragraphs 3.148 to 3.158.
[436] euNetworks response to January 2020 Consultation, paragraph 84.
[437] Three response to January 2020 Consultation, section 6.
[438] In November 2020, Openreach announced that it was going to start imposing an annual surcharge for leased line circuits being used to aggregate FTTP to multiple premises, with effect from 1 January 2021. Openreach said this was because these circuits are not part of the relevant market where it has SMP. A number of stakeholders have asked us to clarify our position on whether these connections form part of the LL Access market (Letter from INCA and UKCTA, dated 10 February 2021; Letter from CityFibre, dated 29 January 2021).

6.80 In the January 2020 Consultation we proposed that different bandwidths are part of the same product market. In particular, we proposed that suppliers are equally able to supply all bandwidths and, therefore, would be able to switch between them at low cost and quickly in response to an increase in the price of a particular bandwidth. This was because:

a) Where a telecoms provider has an existing connection to the customer site it can be used to provide the full range of leased line services. The only difference between different services is the electronic equipment installed at the circuit ends, and in some cases, the same equipment can be used to provide different leased line bandwidths.

b) Where telecoms providers do not have an existing connection, the evidence indicated that their ability to supply a customer does not differ by bandwidth, therefore pointing at similar competitive conditions across all bandwidths.[439]

6.81 We recognised that if some leased lines have higher prices and margins (e.g. VHB services), it may be more profitable for a provider to extend its network to supply those lines than to extend its network to supply lines with lower margins. However, we noted evidence (originally presented in BCMR 2019) which suggested that BT's rivals rarely dig to connect customers even where these higher margins apply and tend not to dig further for these higher margin services than for other services. Also, that these higher prices could be themselves be a reflection of BT's market power and the difference in margins merely reflect the fact that VHB services had not been subject to as stringent price controls as had other leased lines. Accordingly, we proposed that even if there was a higher propensity to dig to connect customers with VHB, it may not necessarily reflect any fundamental difference in supply-side conditions, and that this was consistent with competitive conditions being similar across all bandwidths.[440]

6.82 We also considered the possibility that PIA will lead to more competition for higher bandwidth services (relative to lower bandwidth services) by encouraging more customer-specific network build to them. We recognised that PIA was less likely to be used for customer specific extensions than for infill of existing networks[441] or building networks in new areas. We considered that higher prices and margins for VHB services could lead to more PIA based network extensions to supply these lines, but noted that this would be merely a function of the differences in price control arrangements for VHB than any fundamental difference in supply conditions.

Stakeholder responses

6.83 BT Group said that, in future reviews, VHB services may emerge as a separate product market. It said that VHB LL Access services (and dark fibre) are generally required by large, sophisticated customers and often used to aggregate traffic from multiple sites and customers, and share many of the same competitive dynamics as largely deregulated

[439] January 2020 Consultation, paragraphs 6.72 – 6.73 and 6.75.
[440] January 2020 Consultation, paragraphs 6.74-6.75.
[441] By infill we mean deploying new network within a telecom providers' existing footprint to "densify" the network.

services. In contrast, lower bandwidth leased lines (up to and including 1Gbit/s, but currently in particular 100Mbit/s lines) are increasingly being replaced by FTTP.[442]

Analysis and conclusions

6.84 In this review period leased lines at 1Gbit/s and below will continue to account for the large majority of leased lines (as discussed in Section 2). Demand for higher speeds is expected to increase and in future reviews it may be that bandwidths above 1Gbit/s become more important. But that is a matter for future consideration, and our expectation at this stage is that supply conditions will evolve to meet demand, as it has done in the past.

6.85 Also, the evidence is that competitive market conditions, as described above, remain largely unchanged. Since the January 2020 Consultation we have updated our analysis of new connections. We found that over the period 2017 to 2019 the frequency of digging by competing networks in the supply of new connections has remained low and, while the average dig distances have increased in the supply of VHB services, the median distance for competing networks is around 20m compared with 14m for slower speeds. As noted above, we consider that a willingness to dig further in the supply of VHB services could be a reflection of higher margins[443] rather than fundamental difference in competitive market conditions. Information for 2019/20[444] confirmed that returns remain higher on VHB connections.

6.86 Accordingly, it remains our views that all bandwidths are in the same product market.

Dark fibre

Our proposals

6.87 Dark fibre is a fibre connection provided between two sites which does not include any powered equipment supplied by the network provider, allowing the customer, or another supplier, to provide the equipment. Provision of the equipment is the only difference compared to active products (Ethernet and WDM services). While BT does not supply dark fibre[445], some other network operators (including Virgin Media, CityFibre and Colt) do, as discussed in Section 2.

6.88 We proposed to include dark fibre in the same market as leased line access services. We considered that the reasons for reaching that conclusion in 2019 BCMR, based on supply-side analysis, would remain relevant over the period of this review:

a) When networks are already fibre connected, they would be able to switch between supplying dark fibre and LL Access services sufficiently quickly and at minimal cost.

[442] BT Group response to January 2020 Consultation, paragraphs 2.74 to 2.79.
[443] 2019/20 confirmed that returns remain higher on VHB connections (source BT Regulatory Financial Statement on Returns on Mean Capital Employed).
[444] Information provided by BT Regulatory Financial Statement on Returns on Mean Capital Employed.
[445] BT does supply dark fibre for IEC services, which it is required to do by existing regulation.

b) Where suppliers are not already connected, dark fibre providers are equally able to supply leased line access services as any other supplier of LL Access services as the incentives to extend their networks will be broadly similar for both services.[446]

6.89 Since the January 2020 Consultation we have updated our analysis of new connections. This has confirmed that the main dark fibre providers (e.g. CityFibre, Zayo, euNetworks and Colt) have all supplied both dark fibre and leased line access services.

Stakeholder responses

6.90 TalkTalk[447] said that we should consider two product markets:

a) a market for leased line access circuits, comprising all bandwidths of leased line access circuits, and dark fibre access circuits; and

b) a market for dark fibre access circuits, with this market not containing any leased line access circuits within it.

6.91 TalkTalk said that we correctly considered whether dark fibre is a substitute for active leased lines but had not carried out a market definition exercise based on dark fibre as a focal market. TalkTalk also said that active leased line products cannot act as a constraint on dark fibre as they need dark fibre themselves in order to be able to operate, that active leased lines offer less functionality and control than dark fibre and, therefore, would be unlikely to act as an effective competitive constraint on a hypothetical monopolist of dark fibre.[448]

6.92 We consider that the supply-side arguments made in the January 2020 Consultation (and set out above) for including dark fibre in the same product market as leased line access services apply whether the focal product is taken to be leased line access services or dark fibre services (when used to supply or self-supply leased line access services).

6.93 TalkTalk's observation that a fibre is a necessary component of an active leased line does not point to separate markets.[449] If customers view active leased lines as good substitutes for dark fibre, or suppliers can easily switch from supplying active leased lines to supplying dark fibre, then an attempt to set high prices for dark fibre would be defeated.[450]

6.94 In addition, that active leased line and dark fibre products have different features does not mean that they are in separate markets. Both active leased line and dark fibre services provide users with dedicated access connections. A relevant product market comprises all those products which are regarded as interchangeable or substitutable by the consumer. A feature of differentiated product markets is that suppliers are competing not only on price but also on the quality and specification of their products.

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[446] January 2020 Consultation, paragraphs 6.77 – 679.
[447] TalkTalk response to January 2020 Consultation, Section 7.2.
[448] TalkTalk response to January 2020 Consultation, paragraph 7.24.
[449] TalkTalk response to January 2020 Consultation paragraph 7.30.
[450] Our objective in this review is to evaluate whether Openreach has market power, and Openreach does not currently supply dark fibre. Moreover, the reason Openreach does not supply is likely because, if it did so, it would cannibalise its active sales, which reinforces our view that this is a single market.

6.95 TalkTalk also said that[451] the 2020 EC Recommendation on relevant markets (2020 EC Recommendation) states that NRAs should assess each market downstream of the most upstream market it analyses (physical infrastructure in this case), implying that we should assess the dark fibre market. TalkTalk also argued that the dark fibre access market passes the three criteria test as laid down by the European Commission for markets which are susceptible to *ex ante* regulation.

6.96 As we do not consider dark fibre to be a separate market from the provision of active services, we are not required to consider the three criteria test for dark fibre alone.[452] In addition, we note that the 2020 EC Recommendation, to which we may have regard, does not list dark fibre as a market susceptible to *ex ante* regulation. The Explanatory Note to the Recommendation states that "if dark fibre is found to exert sufficient competitive constraint over the pricing of leased lines, it could be included in the same relevant market for dedicated capacity" and that "…from the supply-side, there are relatively low barriers to a dark fibre supplier to offer active leased line connectivity and vice versa, and many commercial suppliers of dedicated capacity make both options available in areas in which they are present".[453]

6.97 Accordingly, it remains our view that dark fibre is in the same market as leased line access services.

Broadband is not a substitute for leased lines

6.98 We proposed in the January 2020 Consultation that broadband access services are not substitutes for LL Access services.

6.99 On the demand-side, we recognised that business grade ultrafast broadband services could be an alternative for some users to leased line services. We noted, however, that over the period of this review, broadband and leased line products would continue to have distinct features. Leased line services provide end-users with a higher quality service at substantially higher prices. Specifically, leased line services tend to be uncontended, and typically, dedicated (providing security). In addition, given the substantial difference in prices, we consider it likely that the customers who continue to purchase leased line services will be those who value the features offered by leased line services and are, therefore, unlikely to consider leased line and broadband products to be close substitutes.

6.100 BT Group agreed with our assessment of the distinctions between residential broadband and leased line markets. In particular, that FTTP networks are unlikely to cater for symmetric and uncontended services above 1Gbit/s. They also said, however, that it is possible that LL Access services up to 1Gbit/s will be increasingly interchangeable with WLA FTTP services as these networks are built.[454] BT Enterprise is reported to be expecting

[451] TalkTalk response to January 2020 Consultation, paragraph 7.28 and 7.29.
[452] The three criteria test is now set out in section 79 of the Act.
[453] *Explanatory Note to 2020 EC Recommendation*, 25 August 2020. https://ec.europa.eu/digital-single-market/en/news/recommendation-relevant-markets, page 51.
[454] BT Group response to January 2020 Consultation, paragraphs 2.71 to 2.74.

that, over the next five years, [✂], and that this may increase even further if Openreach provides a business grade FTTP service in the future.[455]

6.101 We consider that the extent of replacement remains uncertain. Also, we consider that, even if we were to see such levels of replacement, this would not be evidence of a single product market. This is because we could be seeing a period of adjustment as some leased line customers, for whom a FTTP-based product would meet their needs, move to FTTP-based broadband products and others, who need and value the distinct features of leased line products, continue to purchase these services.

6.102 For these reasons, it remains our view that broadband access services are not sufficiently close substitutes for leased lines access services to include them in the same market.

Ethernet in the first mile (EFM)

6.103 EFM uses copper connections from the BT exchange to connect to the customer. The highest achievable speeds are significantly lower than for fibre, and the speed diminishes the further the customer is from the exchange. EFM is being superseded by Ethernet over FTTC which is faster and cheaper.

6.104 We proposed in the January 2020 Consultation that EFM[456] is unlikely to sufficiently constrain leased line access services to consider them in the same product market, even when considering substitution from lower speed leased lines.[457] No stakeholders commented on this issue. Accordingly, it remains our view that EFM is not in the market.

Mobile backhaul

6.105 In the January 2020 Consultation we proposed to define a single product market for the provision of LL Access services to all customers. This was based on an assessment of whether there are significant differences in competitive market conditions in the supply of mobile backhaul compared to other LL Access services.

6.106 We recognised that there may be differences between MNOs and other customers in their demand for leased line access services. We found the main differences to be that MNOs are individually among the largest purchasers of leased lines and that unlike most other customers, MNOs need nationwide coverage. We noted that, while the volume of circuits purchased could strengthen the negotiating position of MNOs compared with other customers, their need for wider geographic coverage could increase their dependency on Openreach as the only network with nationwide coverage. Overall, drawing on a range of evidence, we concluded that the differences between MNOs and other customers in their

[455] BT Group response to January 2020 Consultation, paragraph 2.79.
[456] Our analysis of EFM substitution also applies to substitution to business grade connectivity provided over symmetric broadband services using SDSL technologies, which is the legacy version of EFM. We have not referred to these technologies explicitly in our analysis as these have been largely superseded by EFM.
[457]For example, results from the 2018 Cartesian report indicate that businesses perceive "copper-based circuits (EFM) […] to be less reliable" than fibre leased line., Ofcom, 2018. *Cartesian Business Connectivity Market Assessment* (2018 Cartesian Report), page 7.

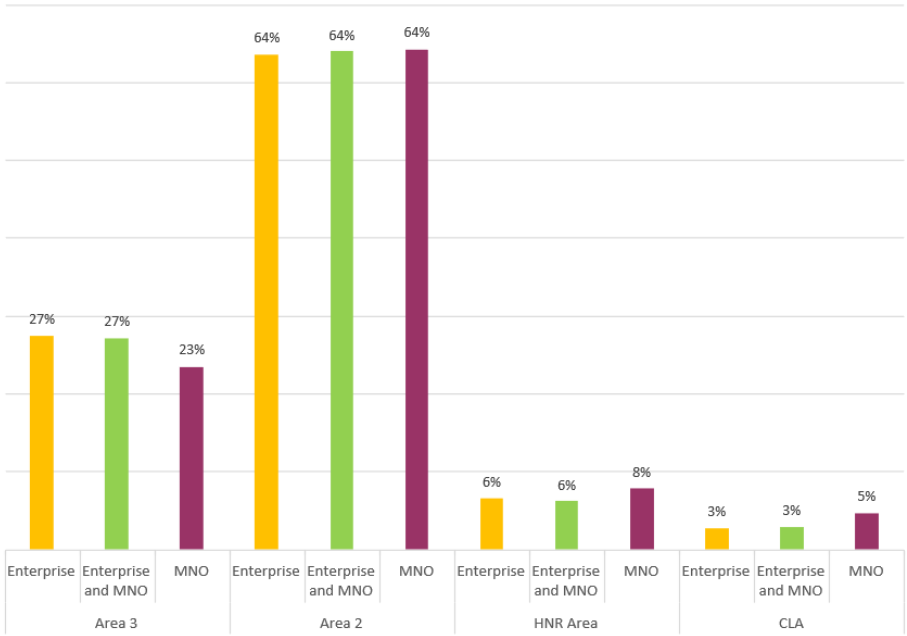
patterns of demand were unlikely to result in a significant difference in competitive market conditions. [458]

6.107 CityFibre and euNetworks did not agree that competitive market conditions are similar in the provision of LL Access services for enterprise and mobile backhaul. [459, 460]

6.108 Since the January 2020 Consultation we have updated the evidence underpinning our assessment. We consider that these updated results continue to support a single market definition.

6.109 First, Figures 6.1 and 6.2 show that MNOs and enterprise access customers continue to have broadly the same geographic distribution, and proximity to rival infrastructure is broadly the same for both customer groups in each geographic market defined.

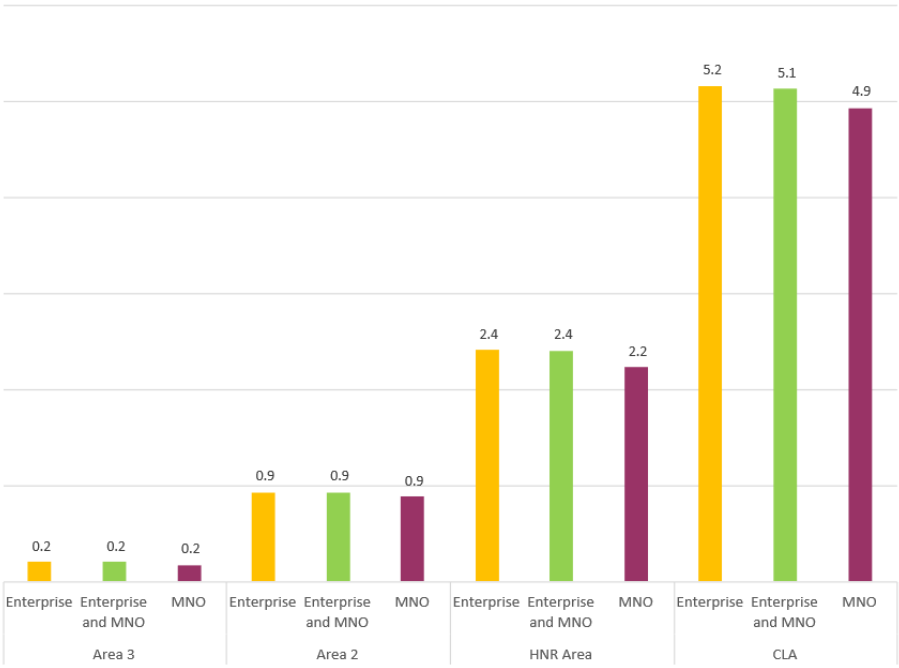
Figure 6.1: Distribution of customer sites by geographic market (%)



Source: Ofcom analysis (see Annex 5 for further details).

[458] January 2020 Consultation, paragraphs 6.88 – 6.89.
[459] CityFibre response to January 2020 Consultation, paragraphs 3.148 to 3.158.
[460] euNetwork response to January 2020 Consultation, paragraph 84.

Figure 6.2: Average number of rival networks within 50m buffer distance



Source: Ofcom analysis of data provided by networks (see Annex 5 for further details).

6.110 Second, while service shares indicate that MNOs currently tend to purchase a larger share of their requirements from Openreach than other customers, updated service shares show that MNOs continue to use multiple service providers (see Annex 5) and BT's share of supply to MNOs has continued to fall from [✂]% in 2017 to [✂]% in 2019. Also, recent evidence (see Section 2) confirms our proposition in the January 2020 Consultation that MNOs' use of their own and rival networks for backhaul is most likely to increase over the review period.

6.111 Third, while MNOs are likely to have an increasing need for VHB services to provide the backhaul capacity required to support 5G rollout, the evidence is that large corporate users and data centres will also have increasing need for higher capacity services (see Section 2).

6.112 Finally, while Openreach launched in 2019 products [✂][461], these products are available to all customers and levels of take-up are similar for MNO and other customers.[462]

6.113 CityFibre said that historically MNOs have relied on BT to provide the nationwide mobile backhaul coverage they require to connect all their base stations. CityFibre also said that while MNOs have sought to break away from their dependency on BT Enterprise, this has been limited to BT exchanges in urban areas. As such, MNOs have been left with no

[461]Openreach response dated 10 September 2020 to s.135 notice dated 20 August 2020, question 4b.
[462] See Openreach response dated 28 January 2021 to s.135 notice dated 14 January 2021, question 1b.

alternative but to purchase MEAS from BT Enterprise in all rural areas.[463, 464] euNetworks said that at many locations where we have found the market for provision of leased lines to be competitive or prospectively competitive, BT is the only or by far the largest supplier of mobile backhaul circuits, despite the presence of other competing networks.[465] Three also said that for [✂] sites in Area 2 it has no choice but to use BT services for mobile backhaul. [466]

6.114 As set out in the January 2020 Consultation, we recognise that there are differences between MNOs and other customers in their demand for LL Access services. We consider, however, that the evidence points to competitive market conditions being sufficiently similar to define a single market. Moreover, we consider evidence, such as that provided by CityFibre, euNetworks and Three, relating to how much choice customers have in the SMP assessment.

6.115 For the reasons given above, it remains our view that, over the period of the review, competitive market conditions in the provision of mobile backhaul services are likely to be sufficiently similar to those in the provision of services to other customers to define a single LL Access product market.

Microwave links

6.116 In the January 2020 Consultation we proposed that microwave links, which can be used for mobile backhaul, are a poor substitute for LL Access circuits. We noted that in BCMR 2019 we had found microwave links to be capable of supporting only lower capacity links, and to have a lower transmission range and higher risk of failure. They also required 'line-of-sight' connectivity.

6.117 No stakeholders disagreed with us on this issue. Accordingly, it remains our view that microwave links are not in the market.

IEC services separate from leased lines

6.118 In the January 2020 Consultation we considered that the different purpose of IEC services leads to a difference in competitive conditions compared to access circuits. Specifically, LL Access services provide a dedicated single link service to a point of aggregation, whereas IEC services provide a service between points of aggregation (BT exchanges), including the provision of connections between points of aggregation located in different access areas.[467]

[463] CityFibre response to January 2020 Consultation, paragraphs 3.148 to 3.158.
[464] MEAS (mobile Ethernet access service) is a mobile backhaul connectivity service, tailored to the requirements of mobile operators, and is provided by BT Enterprise (formerly BT Wholesale).
[465] euNetworks response to January 2020 Consultation, paragraph 84.
[466] Three response to January 2020 Consultation, section 6.
[467] January 2020 Consultation, paragraphs 6.91-6.92.

6.119 We also noted that defining separate markets for LL Access services and IEC services is consistent with the EC approach which considers there to be a clear difference between terminating (i.e. access) and trunk segments.[468]

6.120 No stakeholder objected to separate markets for IEC and LL Access. No evidence has been presented to suggest that this difference in competitive conditions is likely to change over this review period. Therefore, we have decided to define separate markets for inter-exchange connectivity and leased line access services. We consider the market for IEC services in more detail below.

Conclusion on product market definition for LL Access

6.121 We define a single product market for LL Access services, which:

a) includes all wholesale fibre-based Ethernet and WDM services;

b) includes dark fibre used to supply or self-supply leased line services;

c) excludes business-grade connectivity services provided over EFM, broadband and microwave links used to provide mobile backhaul; and

d) excludes IEC services between BT exchanges.

Market definition for IEC services

6.122 In addition to WLA and LL Access, we have also considered IEC services, which are a type of trunk segment. We define trunk segments as circuits carrying aggregated capacity between points of aggregation.[469] These are typically made up of backhaul and core connections between network nodes, BT exchanges and data centres (excluding data centres not used as points of aggregation such as a 'corporate hubs').

Our proposals

6.123 In the January 2020 Consultation we proposed not to revisit our analysis of those trunk segments that we had previously presumed to be effectively competitive in 2019 BCMR (this comprised all circuits in the trunk segment except circuits between BT exchanges).[470] We proposed to undertake a new competitive assessment of circuits between BT exchanges, which we referred to as IEC services, as we had found SMP for some of these

[468] Explanatory Note to the 2014 EC Recommendation, pages 49-50 mentions that "[…] a clear distinction between the terminating and trunk segment is important as the market for wholesale trunk segments of leased lines has been removed from the list of markets susceptible to *ex ante* regulation in the 2007 Recommendation." The 2020 EC Recommendation has been published since the Consultation. The Explanatory Note to this Recommendation similarly notes that "Inter-exchange/trunk segments should normally be excluded [from the dedicated capacity market / terminating segments] as normally provided on competitive basis" (page 57, footnote 171). As explained in Annex 1 we may have regard to the EC Recommendation on relevant markets, notwithstanding the UK's departure from the EU.

[469] Annex 2 explains that connections between exchanges may be part of an access circuit, in which case they are excluded from the trunk market.

[470] January 2020 Consultation, paragraphs 6.17-6.21.

routes in 2019 BCMR.[471] We proposed to define a single product market for IEC services, including active services at all bandwidths between BT exchanges and dark fibre between BT exchanges.[472]

Stakeholder responses

6.124 A small number of stakeholders commented on our proposed approach.

6.125 Vodafone argued that we should extend the IEC product market definition to include connections from BT exchanges to a telecom provider's network node, as well as those between BT exchanges. Vodafone submitted that our focus on BT exchange to BT exchange connectivity fails to adequately represent how the market functions, and leaves essential links between BT and telecoms providers outside the market and without remedy.[473] Vodafone said connections between BT exchanges and between BT exchanges and a telecoms provider's network are both substitutes and complementary services to one another, consequently falling within the same economic market. Vodafone explained [✂].[474]

6.126 Although we had presumed links between BT exchanges and telecoms providers' network nodes to be effectively competitive in 2019 BCMR, Vodafone argued that we had not undertaken any detailed analysis into the function of these links and had overstated the prospect of competition, leading to a false presumption that some competitive supply was available. It submitted that we should analyse the data on purchases of these links and question why Openreach is sought out to supply them.[475]

6.127 Similar to its argument in relation to LL Access circuits, TalkTalk argued that there are two product markets for IEC:

a) a market for inter-exchange leased line circuits, including inter-exchange dark fibre within the relevant market; and

b) a market for inter-exchange dark fibre circuits, with this market not including any inter-exchange leased line circuits within it. [476]

6.128 TalkTalk said there is no difference between dark fibre used as an input for inter-exchange leased lines circuits and that used for leased line access circuits, and the economic analysis is directly analogous.

6.129 We address stakeholders' comments below. [477]

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[471] January 2020 Consultation, paragraph 6.21.
[472] January 2020 Consultation, paragraphs 6.94-6.98.
[473] Vodafone response to January 2020 Consultation, Part 2, paragraph 4.2.
[474] [✂] response to January 2020 Consultation, [✂].
[475] Vodafone response to January 2020 Consultation, Part 2, paragraphs 4.15-4.17.
[476] TalkTalk response to January 2020 Consultation, paragraph 7.35
[477] In response to the January 2020 Consultation, BT Group (in Annex 7 of its response) requested that we clarify that links built out to former EE core nodes and other operational buildings (i.e. not a BT Exchange) are not subject to regulation (see BT Group response to January 2020 Consultation, Annex 7, p.49). The legal conditions in Volume 7 specify the BT exchanges at which the supply of inter-exchange connectivity is regulated.

Our assessment

Trunk segments

6.130 Under the 2014 EC Recommendation, there was a presumption that all trunk segments were not susceptible to *ex ante* regulation.[478] However, NRAs might find that certain trunk routes warranted *ex ante* regulation if they fulfilled the three criteria test set out in the Recommendation.[479] Against this backdrop, in BCMR 2019 we looked at each different type of trunk connection and concluded that the presumption of competitiveness was appropriate for all types of trunk segments, except IECs[480].

6.131 As noted above, we proposed in the January 2020 Consultation not to revisit our analysis of those trunk segments which we had presumed to be competitive in the 2019 BCMR. This included connections from BT exchanges to telecoms providers' network nodes.

6.132 Vodafone is concerned about these links. It submitted that we had not undertaken any detailed analysis in 2019, that we had reached a false presumption that some competitive supply of these connections was available, and that we should therefore revisit this analysis.

6.133 We are not required by the Act to analyse these links. Aside from an obligation to review existing market power determinations[481], we have discretion to determine which markets it is appropriate for us to consider in the circumstances of the UK.[482] We have considered Vodafone's comments but, in our view, they do not warrant us re-visiting our analysis of these links as part of this review. We note that *ex ante* regulation is a particularly intrusive form of regulation to be applied to a limited set of markets that exhibit special characteristics – when there are significant and enduring structural issues and *ex post* competition law cannot address the market failures. We are also required to have regard to principles of best regulatory practice, including that regulation should be proportionate and targeted only at cases in which action is needed.[483]

6.134 It appears that the concerns raised by Vodafone may reflect its particular circumstances and network configuration. In BCMR 2019 we noted that Vodafone had configured its backhaul network when regulated BT-CP products were available.[484] Vodafone has also told us that, [✂].

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[478] Since trunk segments were not specified as a market in the Annex to the 2014 EC Recommendation, there was a presumption that the three criteria test was not met across the EU.
[479] The same position is also reflected under the 2020 EC Recommendation.
[480] Ofcom, 2019. *Statement: Promoting competition and investment in fibre networks – review of the physical infrastructure and business connectivity markets*, Vol.2: Business Connectivity Market Review (2019 BCMR) , paragraphs 7.30-7.45.
[481] Section 84 of the Act.
[482] Section 79(1) of the Act.
[483] Section 3(3) of the Act.
[484] In BCMR 2019, we considered an argument made by Vodafone that the removal of regulation from BT exchanges to telecom providers' network nodes may result in significant reconfiguration costs and potentially poorer resilience resulting in worse customer outcomes. This did not affect our assessment that these connections could be presumed competitive over the forward-look of the 2019 – 2021 review period. However, we recognised that some telecoms providers may have

6.135 We asked Vodafone for further information on how many BT exchange to Vodafone network node connections it currently uses and, looking forward, its plans for providing these connections. Vodafone told us that:

a) as at August 2020, it purchased [✂] such connections from BT;

b) looking forward, where possible, it plans to [✂][485]; and

c) as at August 2020, it estimated [✂].

6.136 Vodafone may therefore be reliant on Openreach for a small number of backhaul connections.[486] However, we consider any potential competition issue to be *de minimis* in the context of considering whether to carry out an *ex ante* market review. In particular, we note that no other stakeholder has expressed concerns about this type of link and that information submitted by Vodafone, in relation to its plans, suggests that PIA has the potential to promote competition in the supply of backhaul services.

6.137 Vodafone has not suggested that, absent *ex ante* regulation, BT might refuse to supply connections from its exchanges to Vodafone network nodes, or to raise prices for these connections.

6.138 There is also no evidence that Openreach would have the incentive to identify the links that are not contestable and then to raise prices. The volume of circuits involved would be a factor in whether it has the incentive to invest in the necessary systems to do this.

6.139 For these reasons, we do not think that it is necessary or proportionate for us to carry out any further analysis of links between BT exchanges and telecoms provider network nodes as part of this review.

Speeds and dark fibre

6.140 As noted above, we consider LL Access and IEC services to be in separate markets. We now consider whether, within the IEC services market, there are separate product markets for different bandwidths or for dark fibre services.

6.141 In the January 2020 Consultation we proposed to follow the same approach as we did in BCMR 2019, which was to define a single product market for IEC services including all bandwidths and dark fibre.[487] Similar to our analysis for LL Access, our findings are primarily

purchased circuits between BT exchanges and their network nodes using a particular type of interconnection product called customer sited handover (CSH), and configured their networks based on the availability of this regulated product. We recognised that making changes to their network configuration could lead to additional costs or disruption as telecoms providers need (or are forced) to cease some circuits and procure new ones on different routes. We therefore decided to maintain a requirement for BT to provide CSH for pre-existing circuits for the 2019 BCMR review period where that CSH is connecting to a BT exchange at which regulated services are available. We did not propose in the January 2020 Consultation to re-impose this obligation on BT for the 2021-25 review period.

[485] Of the [✂] BT active connections that Vodafone said it would be replacing, for [✂] PIA was identified as the alternative.

[486] Vodafone told us that it currently has a total of [✂].

[487] January 2020 Consultation, paragraphs 6.96-6.97.

underpinned by the potential for supply-side substitution. No stakeholders objected to this proposal in the consultation.

6.142 Whether providing a new or existing connection to the customer site, a network provider would most likely have the capability to provide both active and dark fibre products and, for active products, at a range of different bandwidths. This is because the only difference between these products is whether or not the network provider supplies the electronic equipment installed at the circuit ends, and in some cases, the same equipment can be used to provide active products at different bandwidths.[488] We therefore consider that active and dark fibre products and different bandwidths to be supply-side substitutes.

6.143 For the same reason as set out above, we do not consider there to be a case for defining a second market for dark fibre used to supply or self-supply leased line inter-exchange circuits, as suggested by TalkTalk.[489]

Summary of product market for IEC

6.144 We define a single market for IEC services which:

a) includes active services at all bandwidths provided between BT exchanges;

b) includes dark fibre between BT exchanges;

c) excludes leased line access services; and

d) excludes all trunk services that do not connect between BT exchanges.

Summary of product market definition

6.145 In summary, we have decided to define three product markets:

a) a single market for WLA services which:

i) includes services at all bandwidths;

ii) includes broadband access services provided by networks deploying mixed copper/fibre, cable and full-fibre technologies;

iii) includes services supporting both residential and business broadband connections;

i) excludes LL Access services; and

ii) excludes retail provision of broadband services delivered over networks deploying wireless technologies;

b) a single market for LL Access services which:

i) includes all wholesale fibre-based Ethernet and WDM services;

[488] This was supported by Openreach's internal documents submitted to Ofcom in response to the 2019 BCMR 8th s135 and views expressed by stakeholders in meetings and in response to the 2019 BCMR consultation. See 2019 BCMR, paragraph 4.68-4.78.

[489] See paragraphs 6.93-97.

ii) includes dark fibre used to supply or self supply leased lines;

iii) excludes business-grade connectivity services provided over EFM, broadband and microwave links used to provide mobile backhaul; and

iv) excludes IEC services between BT exchanges; and

c) a single market for IEC services which:

i) includes active services at all bandwidths provided between BT exchanges;

ii) includes dark fibre between BT exchanges;

iii) excludes LL Access services; and

iv) excludes all trunk services that do not connect between BT exchanges.

7. Geographic market definition for wholesale network services

7.1 In this section we define geographic markets for wholesale local access (WLA), leased line access (LL Access) and inter-exchange connectivity (IEC) services.

7.2 We set out the evidence, analysis and reasoning we have undertaken to reach our decisions having consulted with stakeholders on our provisional geographic definitions in the January 2020 Consultation. In doing so, we take account of the responses we have received from stakeholders on identifying geographic markets.

7.3 In the WLA and LL Access markets, we define geographic markets based on the degree of competition provided by rival networks to BT. We carry out our analysis at postcode sector level, taking into account both existing and planned build in each postcode sector. We then group together areas that we find to have similar competitive conditions.

7.4 We expect Virgin Media and CityFibre to create different competitive conditions in the supply of WLA and LL Access services in some parts of the UK (which we define as Area 2), compared to areas where they are not present (Area 3).

7.5 For LL Access services, we also take account of additional competitors that operate leased line only networks in the business districts of large cities. We consider that the Central London Area (CLA) has unique competitive conditions, with a high degree of competition from leased lines only networks. We also identify a number of other business districts with broadly similar competitive conditions, which we refer to as the High Network Reach Area (HNR Area).

7.6 In the IEC markets, we consider each BT exchange to be a distinct geographic market.

Summary of the geographic markets we have identified

7.7 We have identified two geographic markets for WLA for the purposes of making a market power determination:

- WLA Area 2: postcode sectors in which there is, or there is likely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks; and
- WLA Area 3: postcode sectors in which there is not, and there is unlikely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks.

7.8 For LL Access, we have identified four geographic markets for the purpose of making a market power determination:

- the CLA;
- the HNR Area: other postcode sectors where there are two or more rival networks to BT in the provision of leased lines;

7.9 For the remaining postcode sectors in the rest of the UK (excluding the Hull Area):

- LL Access Area 2: postcode sectors in which there is, or there is likely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks; and
- LL Access Area 3: postcode sectors in which there is not, and there is unlikely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks.

7.10 The premises covered by the Area 2 and Area 3 geographic markets are the same for WLA and LL Access, except for those postcode sectors that are included in the CLA or HNR Area.

7.11 In relation to IEC, we identify each new BT+2 exchange[490] and each BT+1 and BT Only exchange as a distinct market for the purposes of making a market power determination.

7.12 Table 7.1 sets out the geographic access markets:

Table 7.1: Summary of geographic access markets[491]

WLA	LL Access
	CLA (278 pcs)
	HNR Area (525 pcs)
Area 2 (6,079 pcs, 21.7m premises)	Area 2 (5,430 pcs)
Area 3 (4,021 pcs, 9.2m premises)	Area 3 (3,867 pcs)

Source: Ofcom.

7.13 The structure of this section is as follows:

a) We discuss our general approach to geographic market definition for the WLA and LL Access markets.

b) We discuss stakeholder responses, our reasoning and decisions in relation to the WLA markets.

c) We discuss stakeholder responses, our reasoning and decisions in relation to the LL Access markets.

d) Finally, we discuss stakeholder responses, our reasoning and decisions in relation to the IEC markets.

7.14 In Annex 4 we discuss in more detail our methodology for assessing Virgin Media and CityFibre network coverage and WLA market shares, while in Annex 5 we explain how we conducted our leased lines analysis.

[490] We do not revisit our assessment of exchanges categorised as BT+2 in previous reviews, unless their categorisation has changed on the basis of our most recent data.
[491] The postcode sectors (pcs) identified for WLA and LL Access (and the premises within those pcs) are based on analysis by Ordinance Survey from May 2020. Figures exclude the 59 postcode sectors associated with the Hull Area.

General approach to geographic market definition for WLA and LL Access

7.15 In this subsection, we provide an overview of some general themes that are relevant to geographic market definition in both the WLA and LL Access markets.

7.16 Market reviews look ahead to how competitive conditions may change in the future. We have conducted a forward-looking assessment taking into account expected or foreseeable developments that may affect competition for the period up to March 2026.

7.17 The key consideration in defining geographic markets is to identify areas within which competitive conditions are sufficiently similar to enable them to be grouped together as one geographic market. We are therefore looking to identify areas of broadly similar competitive conditions for each of WLA and LL Access. Competitive conditions do not need to be identical across a geographic market.

7.18 To assess competitive conditions in the provision of WLA and LL Access services, we have:

- used information gathered for our Connected Nations Summer 2020 report on the existing level of fixed broadband coverage across the UK[492];
- used our statutory powers to collect data on the existing presence of networks supplying leased lines;
- used our statutory powers to gather information from a wide range of operators on their plans for additional network build up to 2026; and
- met with a wide range of broadband and leased line operators to discuss their future network build plans, their competition concerns, and to hear their views on how they see markets developing over the course of this review.

7.19 In defining geographic markets for the purpose of *ex ante* regulation we need to sufficiently capture the expected competitive conditions that we believe are likely to exist over the review period. In doing this, a number of judgments and approximations need to be made. Further, there are limitations in the data available to us and there is a need to create a practical and workable regulatory environment. It is with this backdrop that we have approached the complex task of geographic market definition.

7.20 When defining markets and imposing regulation we aim to strike a balance between not under-regulating and leaving consumers exposed to abuse, and not over-regulating and stifling the competitive dynamics.

7.21 While clearly relevant to our forward-looking market analysis, evidence from operators' plans is necessarily prospective. There are differences in the level of certainty associated with different operators' ambitions for roll-out. Operators' plans for different towns and cities might be at different stages of development, with some areas at an advanced 'ready to build' stage and other areas being longer-term targets. Some operators may not ultimately build out to the full extent of their current plans, or may alter their plans and

[492] Ofcom, 2020. *Connected Nations Update – Summer 2020*.

build elsewhere, and network build plans that stretch further into the future are likely to be less accurate than near-term plans.

7.22 For these reasons, we acknowledge that there is inherent uncertainty in defining geographic markets over the forward look, particularly during a dynamic period in which we are expecting substantial network build.[493] We have used our regulatory judgment to assess the evidence we have gathered and take a view on likely developments over the period of the review, recognising that this can only ever be an approximation of reality.

7.23 We have decided to define different geographic markets according to our view of where there is likely to be potential for material and sustainable competition (Area 2) and where this is unlikely (Area 3). This seeks to differentiate areas where there is likely to be potential for competition on a sufficient scale to have a material and sustainable competitive impact on Openreach (though not necessarily to the degree that BT would no longer have SMP). For the reasons explained further below, we have determined the areas where there is likely to be potential for material and sustainable competition by reference to the areas planned to be covered by 2026 by Virgin Media or CityFibre. We recognise that there may be build by other competitors outside of Area 2, but we expect the competitive impact of these smaller expansions will be substantially less.

7.24 In previous market reviews we have defined the geographic markets for WLA and leased lines independently. However, as noted, in the period covered by this review we expect the potential for new network build to be much more dynamic than in the past. We expect Virgin Media and CityFibre to provide material and sustainable competition to BT in both the WLA and LL Access markets, and have therefore set the boundary for Area 2 in both product markets by reference to the expected presence of these networks.

7.25 We also recognise that there are 'leased lines only' networks which provide an additional important source of competition in some geographic areas. We have previously found the CLA to be effectively competitive for the provision of wholesale leased lines.[494] Outside of the CLA, we have identified the HNR Area, comprising areas in which there are at least two rival networks to BT providing leased lines.

Geographic market definition for WLA

Our proposals

7.26 In the January 2020 Consultation we proposed the following WLA markets:

- Area 2 – where there is already some material commercial deployment by rival networks to BT, or where this could be economic; and

[493] While build plans are prospective, some of the prospective build plans given to us in the past are now progressing well. In the period between our January 2020 Consultation and this statement, there is evidence of significant build by both Virgin Media and CityFibre, including the successful delivery of network build to areas they had previously told us they planned to reach by this date. We discuss network operators' build plans in more detail in Annex 3.
[494] Referred to as 'CI Access Services' in BCMR 2019.

- Area 3 – where there is unlikely to be material commercial deployment by rival networks to BT.[495]

7.27 We defined these areas by reference to the existing and planned footprint of the Virgin Media, CityFibre and FibreNation[496] networks. These networks had existing coverage, had been able to provide us with roll-out plans, and either already provided both WLA and LL Access, or their business plans assumed the provision of both services (we referred to them as 'multi service networks').[497]

7.28 We also recognised that we needed to take account of the expected impact of other networks.[498] We therefore considered the existing and planned coverage of a further nine 'broadband only' operators. For some of those operators, we considered their presence (existing or planned) in any given area would not materially alter the competitive conditions in that area. For others, we considered it too early to reach a view, as they were not yet providing services to any material extent. [499]

7.29 We also considered defining an 'Area 1' market, where there are at least two established rival networks to BT. Although we identified a small number of areas that had seen investment by two rivals to BT, we considered that competition was not yet well established in those areas and did not therefore propose to define an Area 1 market.[500]

Stakeholder responses

7.30 A number of stakeholders disagreed with our proposed approach to defining geographic markets. Their arguments can be placed into the following broad categories:

- **Boundary between Area 2 and Area 3:** Some stakeholders argued that parts of Area 3 had potential for competition and should be moved to Area 2.
- **Whether Area 2 should be subdivided:** Some stakeholders argued that our proposed Area 2 should be sub-divided, e.g. according to whether competing networks already existed or were planned.
- **Methodology:** e.g. suggestions that instead of using roll-out plans, we should have made our own assessment of the potential for network competition.

7.31 We consider these comments below, setting out stakeholder responses followed by our reasoning and decisions for each of these categories.

[495] January 2020 Consultation, Volume 1, paragraph 2.26 and Volume 2, paragraph 7.6. At Volume 2, paragraph 7.92, we used the same formulations, but referred to 'rival MSNs', rather than 'rival networks'.
[496] FibreNation was acquired by CityFibre in March 2020. See CityFibre, 2020. *CityFibre completes its acquisition of FibreNation* [accessed 1 March 2021].
[497] January 2020 Consultation, Volume 2, paragraphs 7.11-7.15 and 7.19-7.54.
[498] January 2020 Consultation, Volume 2, paragraphs 7.14 and 7.55-7.65.
[499] We also identified additional operators with ambitions to build, but whose plans were not sufficiently developed to be included in our modelling.
[500] January 2020 Consultation, Volume 2, paragraphs 7.46-7.52.

Boundary between Area 2 and Area 3

7.32 Several respondents said that we had not made a robust or consistent case for defining Area 2 and Area 3 with reference only to build by CityFibre and Virgin Media.[501] Several respondents said they had plans to commercially deploy a network in Area 3 with the capability to support the provision of broadband and leased line services.[502] Respondents said that failure to take account of this build means that there are parts of Area 3 that should be classified as Area 2.[503]

7.33 CityFibre proposed that parts of Area 3 where there is potential for rival network deployment should either be moved to Area 2 or moved to a new, additional market.[504]

7.34 BT Group argued that we have understated the potential for build in Area 3, whether commercial or supported by public funding.[505]

7.35 Openreach considered that there will be significant scope to deploy new gigabit-capable networks within Area 3, either commercially or supported by public funding. Openreach noted that other operators were continuing to revise and develop their roll-out plans and that this included commercial build in Area 3.[506]

7.36 Virgin Media said that we had underestimated the potential for competitive build in Area 3. It said that new entrants regularly announcing intentions to invest and build network, new Electronic Communications Code powers applications being granted and new providers using PIA, were all indicative of a growing pool of infrastructure builders.[507]

7.37 Several respondents argued that Area 3 is too large because UK Government analysis suggests that only 3.1m premises require public subsidy, and that a further 3.1m are commercially viable but at risk of no investment. The respondents suggest that Area 3 should be limited to these premises only.[508]

Further evaluation since January 2020 Consultation

7.38 Since the January 2020 Consultation we have looked again, in some detail, at the planned build by a broad range of rival networks, including networks other than Virgin Media and CityFibre. We have looked at the scale of their build, their business models and volume

[501] Axione, paragraphs 4.1-4.5; Fern Trading, paragraphs 11-12; Gigaclear, paragraph 43; INCA, paragraphs 35-48; Jurassic Fibre, paragraphs 7-13; Swish Fibre, paragraphs 4-7; and UKCTA, paragraphs 21-25, in their responses to the January 2020 Consultation. INCA were unclear on why publicly funded networks are excluded from the analysis. See INCA response to January 2020 Consultation, paragraph 70.
[502] County Broadband, paragraphs 18 and 23-24; Fern Trading, paragraphs 7 and 10; INCA, paragraphs 7 and 29; Jurassic Fibre, Key Points and paragraphs 32-33; and Swish Fibre, paragraphs 6 and 9-10, in their responses to the January 2020 Consultation.
[503] Fern Trading, paragraphs 11-13; Gigaclear, paragraph 43; INCA, paragraph 37; Jurassic Fibre, paragraphs 16 and 35-37; and Swish Fibre, paragraphs 4-7 and 13, in their responses to the January 2020 Consultation.
[504] CityFibre response to January 2020 Consultation, paragraphs 3.92-114.
[505] BT Group response to January 2020 Consultation, paragraphs 2.24-2.26.
[506] Openreach response to January 2020 Consultation, paragraphs 2.55 to 2.59.
[507] Virgin Media response to January 2020 Consultation, paragraphs 57 to 59.
[508] DCMS, 2018. *Future Telecoms Infrastructure* Review, page 4-5. Jurassic Fibre, paragraph 16; and Swish Fibre, paragraphs 8-13, in their responses to the January 2020 Consultation.

forecasts.[509] We have also looked at evidence from BT's internal documents and pricing in assessing the competitive threat to BT from rival network presence.[510]

7.39 Our assessment is that the likely competitive constraint on BT posed by each of Virgin Media and CityFibre is clearly an order of magnitude different from that posed by the other smaller altnets. In the following paragraphs, we describe the reasons for this in terms of Virgin Media's and CityFibre's scale, range of products and services and ability to attract ISPs compared with other networks.

Competition from Virgin Media and CityFibre

7.40 It is clear that Virgin Media is a material and sustainable competitor to Openreach:

- Virgin Media has an established network presence that currently covers around 15m premises and plans to expand to cover nearly 17m premises by 2026.[511]
- Virgin Media supplies both broadband and leased lines throughout its network;[512]
- Virgin Media has [✂] broadband connections nationwide and a 21-40% [✂] share of broadband connections in Area 2.
- Virgin Media has a 11-20% [✂] share of leased line connections over the period 2017 to 2019 in the UK and 21-30% [✂] in Area 2.
- To date Virgin Media has limited itself to retail competition in broadband and does not currently supply wholesale access services to ISPs. However, as discussed in Section 8, there is potential for wholesale competition from Virgin Media.
- We have seen evidence to the effect that BT has moderated its strategic[513] and [✂][514] choices in response to competition from Virgin Media or the threat of it.

[509] Airband responses dated 30 September 2020 and 14 October 2020 to the s.135 notice dated 8 September 2020, questions 1-6; Axione response dated 21 September 2020 to the s.135 notice dated 20 August 2020, questions 1-6; B4RN response dated 4 September 2020 to the s.135 notice dated 14 August 2020, questions 1-6; CityFibre response dated 18 August 2020 to the s.135 notice dated 21 July 2020, questions 1-10 and response dated 21 January 2021 to the s.135 notice dated 15 October 2020, question 1; Community Fibre response dated 10 September 2020 to the s.135 notice dated 20 August 2020, questions 1-6; County Broadband response dated 25 September 2020 to the s.135 notice dated 4 September 2020, questions 1-6; Gigaclear response dated 1 October 2020 to the s.135 notice dated 20 August 2020, questions 1-8; Hyperoptic responses dated 22 September 2020, 25 September 2020 and 30 September 2020 to the s.135 notice dated 19 August 2020, questions 1-8; Jurassic Fibre response dated 29 September 2020 to the s.135 notice dated 20 August 2020, questions 1-6; Swish Fibre response dated 28 September 2020 to the s.135 notice dated 17 August 2020, questions 1-6; Toob response dated 21 September 2020 to the s.135 notice dated 1 September 2020, questions 1-6; Truespeed response dated 30 October 2020 to the s.135 notice dated 19 August 2020, questions 1-6; Virgin Media response dated 8 September 2020 to the s.135 notice dated 22 July 2020, questions 1-10, also response dated 10 September 2020 to the s.135 notice dated 21 August 2020, question 1 and response dated 9 October 2020 to the s.135 notice dated 25 September 2020, question and Zzoomm response dated 28 September 2020 to the s.135 notice dated 17 August 2020, questions 1-6.

[510] Openreach response dated 10 September 2020 to the s.135 notice dated 20 August 2020, question 2.

[511] Virgin Media is located in urban and suburban areas and is densifying its network with Project Lightning. See Virgin Media response dated 10 September 2020 to the s.135 notice dated 20 August 2020, question 1.

[512] We consider competitive conditions in relation to LL Access separately below, drawing on some of the evidence set out here. However, the fact that Virgin Media (and CityFibre) competes with BT across both WLA and LL Access services increases the threat to BT in each of those markets individually.

[513] For example, BT announced its roll-out of superfast broadband shortly after Virgin Media's upgrade to DOCSIS 3.0. See Ofcom, 2016. *Initial conclusions from the Strategic Review of Digital Communications*, paragraph 4.11.

[514] See Section 8, discussion of countervailing buyer power.

- Virgin Media has existing agreements to supply mobile backhaul to [✂] and [✂].[515]

7.41 CityFibre competes in broadband and leased lines. It is in the early phase of its network roll-out but has well developed plans to build a large-scale network.[516] This roll-out would result in a second material and sustainable competitor to Openreach:

- CityFibre has a network that currently covers over 0.5 million premises and plans to build to [✂] premises by the end of 2026.[517]
- CityFibre's forecasts show that it expects to supply around [✂] broadband connections by the end of the review period.[518]
- CityFibre supplies both broadband and leased lines and CityFibre's future expansion plans will also increase their coverage of leased line demand sites.
- CityFibre is competing as a wholesale provider of broadband and leased line access services, and has wholesale agreements in place with TalkTalk and Vodafone.[519] CityFibre was [✂][520] [✂].[521] Competition in wholesaling could enable CityFibre to grow customer penetration on its expanding network quickly, with corresponding loss of volumes for Openreach.
- Competing in leased lines is central to CityFibre's business model.[522] CityFibre has agreements for the provision of mobile backhaul with [✂] and [✂].[523] [✂] told us that it was interested in negotiating with both CityFibre and Virgin Media for the provision of mobile backhaul.[524]

Other altnets

7.42 The next largest network, based on existing and planned build, is Hyperoptic. Hyperoptic's network current coverage is [✂] premises and it has plans to increase this to c.5m by 2026.[525]

7.43 We expect most of Hyperoptic's planned 5m coverage by 2026 to be in Area 2.[526] Hyperoptic builds out to targeted locations such as multi-occupancy buildings. So, in

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[515] [✂] response dated [✂] to the s.135 notice dated [✂], question 3a and [✂] response dated [✂] to the s.135 notice dated [✂], question 3a.
[516] CityFibre has confirmed its build plans since Openreach announced its commitment in July 2020 to extend its FTTP build to pass 20 million homes in the UK.
[517] [✂]. See CityFibre response dated 5 March 2021 to s.135 notice dated 26 February 2021, question 5.
[518] CityFibre response dated 1 October 2020 to the s.135 notice dated 21 July 2020, question 1.
[519] CityFibre response dated 18 August 2020 to the s.135 notice dated 21 July 2020, question 8.
[520] CityFibre response dated 13 January 2021 to the s.135 notice dated 13 January 2021, question 1-2.
[521] [✂] response dated [✂] to the s.135 notice dated [✂], question 3.
[522] See Annex 3.
[523] CityFibre response dated 18 August 2020 to the s.135 notice dated 21 July 2020, question 3; [✂] response dated [✂] to the s.135 notice dated [✂], question 3.
[524] [✂] response dated [✂] to the s.135 notice dated [✂], question 3. [✂]. See [✂] response dated [✂] to the s.135 notice dated [✂], questions 1-2.
[525] See Annex 3.
[526] Based on Connected Nations data, we estimate that of the [✂] postcode sectors where Hyperoptic currently has coverage, [✂] are in Area 2. In their consultation response, Hyperoptic states, "Hyperoptic is the largest provider of 1 Gb residential broadband in the UK and currently use a Fibre to the Building infrastructure operating across 28 cities with ambition to service significantly more" (see Hyperoptic response to January 2020 Consultation, page 1). This suggests that Hyperoptic is targeting dense urban geographies. [✂] (see Hyperoptic response dated 10 October 2020 to the s.135 notice dated 19 July 2020, question 4).

geographic areas where Openreach only faces competition from Hyperoptic, we do not generally expect this to result in material competition. We have not therefore used Hyperoptic's build plans to set the Area 2 boundary. However, where Hyperoptic is competing with Openreach alongside Virgin Media or CityFibre, that will represent an important additional source of competition, adding to the intensity of competition in Area 2 by comparison with Area 3.

7.44 Other altnets are significantly smaller, and their business plans are often more speculative.

7.45 As set out in more detail in Annex 3, there are many other operators planning to build new networks or to extend existing (but smaller) networks in a range of areas, some in Area 3. For example, [✂] is [✂], Swish Fibre focuses on [✂] the Home Counties, and Jurassic Fibre on towns and villages in South West England.[527] Others, including County Broadband, focus on rural communities.[528] These locations are typically less densely populated which means that they are less likely to be able to support network competition.

7.46 Some altnets are targeting areas where competition may not be sustainable in the long run. Many of them do not expect to overbuild, or be overbuilt, for at least the duration of the review period, in these areas.[529]

- Several stakeholders have told us that the threat of being overbuilt by Openreach significantly undermines their investment case.[530] [✂] told us that Openreach's list of planned build locations is having a chilling effect, making local authorities and ISPs less willing to engage with smaller providers.[531]
- Some altnets rely, at least in part, on public funding to make their build plans financially viable (for example, Gigaclear) or on other forms of community support (for example, B4RN and Truespeed).[532]

7.47 Several stakeholders told us that some altnets have the capability to provide a full range of services, including leased line services.[533] However, the information that they have provided indicates that their business models will, over the period of the review, be focused on the provision of broadband services. Leased lines volume forecasts submitted by operators and MNOs indicate that these smaller altnets will be supplying low volumes

[527] Jurassic Fibre response dated 18 August 2020 to the s.135 notice dated 18 August 2020, question 4; Swish Fibre response dated 27 September 2020 to the s.135 notice dated 17 August 2020, question 4 and [✂] response dated 11 September 2020 to the s.135 notice dated 17 August 2020, question 4.
[528] County Broadband response dated 25 September 2020 in response to the s.135 notice dated 4 September 2020, question 4.
[529] [✂] response dated [✂] to the s.135 notice dated [✂], question 1; [✂] response dated [✂] to the s.135 notice dated [✂], question 1.
[530] [✂] response dated [✂] to the s.135 notice dated [✂], question 1; [✂] response dated [✂] to the s.135 notice dated [✂], question 1; [✂] response dated [✂] to s.135 notice dated [✂], question 1.
[531] [✂] response dated [✂] to s.135 notice dated [✂], question 1.
[532] Gigaclear response to January 2020 Consultation, paragraphs 6-7.
[533] [✂], paragraphs 23-24; Fern Trading, paragraph 7; INCA, paragraphs 7 and 62; Jurassic Fibre, paragraphs 32-33; Swish Fibre, paragraph 6; and [✂] in their responses to the January 2020 Consultation.

of leased lines over the review period.[534] We also note that the provision of leased lines requires different operational capability from the provision of broadband services.[535]

7.48 Moreover, several other networks have told us that they have not been successful in securing deals with large ISPs,[536] and one large ISP has confirmed that the scale of these operators is a reason for its reluctance to enter into agreements with them (given, for example, ISPs' desire for a consistent product offering and the operational challenges involved in working with multiple networks).[537] [✂] likewise told us that smaller altnets are not commercially attractive suppliers because of their limited footprints.[538]

7.49 We recognise that smaller altnets play an important role in providing fibre to rural areas. They have served rural communities at a time when Openreach has not been willing to extend its network to harder to reach areas, and they will continue to contribute towards the goal of providing fibre to most of the UK. But given the evidence available to us, we consider that smaller altnets are unlikely to provide the same competitive constraints as CityFibre and Virgin Media.

Conclusions

7.50 Considering all the evidence set out above, we assess that areas of CityFibre and/or Virgin Media presence (existing or planned) provide the potential for material and sustainable competition to BT for WLA services (Area 2).

7.51 The competitive impact of other altnets is of an order of magnitude smaller and we have decided that areas where they operate (but CityFibre and/or Virgin Media do not) are unlikely to have the potential for material and sustainable competition to BT for WLA services (Area 3).

7.52 We therefore consider that conditions of competition for WLA services [539] are likely to differ significantly over the period of this review between Area 2 and Area 3.[540]

7.53 We also therefore consider that conditions of competition within Area 3 are sufficiently homogeneous to define a single market. We go on to consider the homogeneity of conditions within Area 2 in the next subsection.

Whether Area 2 should be subdivided

7.54 In response to the January 2020 Consultation some stakeholders suggested that we had overestimated the potential for network competition in Area 2 and that Area 2 is

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[534] [✂] response dated [✂] to s.135 notice dated [✂], question 1; [✂] response dated [✂] to s.135 notice dated [✂], question 1; [✂] response dated [✂] to s.135 notice dated [✂], question 1; [✂] response dated [✂] to s.135 notice dated [✂], question 1.
[535] For example, different operational field forces may be needed to provide mass market broadband as opposed to leased lines, where there are fewer customers but provisioning and fault repair may be more complex.
[536] [✂] response to January 2020 Consultation, [✂].
[537] [✂] response dated [✂] in response to s.135 notice dated [✂], question 1.
[538] [✂] response dated [✂] to s.135 notice dated [✂], question 1; [✂] response dated [✂] to s.135 notice dated [✂], question 3.
[539] We consider the position in relation to LL Access separately below, drawing on some of the evidence set out above.
[540] Hyperoptic is the only other competing network planning to operate at some scale, and most of its network is within the Area 2 boundary we have decided on, adding to the strength of competition in Area 2.

insufficiently homogeneous to be defined as a single market. Some proposed splitting Area 2 into two or three separate geographic markets (for example defining separate markets according to whether competition is actual or prospective).[541]

7.55 BT Group said that competitive conditions are significantly affected by whether or not Virgin Media is already present in an area and that there is, therefore, a *prima facie* case for demarcating geographic markets based on whether or not Virgin Media is present and potentially where it has concrete plans to extend its network over the next market review period.[542]

7.56 UKCTA said that it is misleading and confusing to call Area 2 "prospectively competitive" since in most cases it is unlikely that there will be effective competition at any point in the foreseeable future. It said that in the longer term parts of Area 2 may revert to being monopoly or duopoly areas and proposed splitting Area 2 into three separate markets: Area 2a – a market where there are two operators plus the possibility of a third; Area 2b – a market where there are two operators throughout the period of review; and Area 2c – a market there is one operator plus the possibility of a second by 2026. UKCTA argued that its proposed Area 2a is the only part of Area 2 which is prospectively competitive.[543]

7.57 TalkTalk said that BT is unlikely to extensively overbuild altnets, including Virgin Media and CityFibre, given that FTTP has 'winner takes all' features. They acknowledge that there will be some instances of overbuild but that it is unlikely to be widespread or systematic. TalkTalk also said that there is a clear difference between the impact of an existing rival and one expected in the future, because of the uncertainty about when and whether they will enter and become established. It proposed dividing Area 2 into three distinct geographic markets depending on whether Virgin Media has an existing presence and whether there is planned altnet build.[544]

7.58 Vodafone considered that Area 2 is too large because it takes into account planned build, in contrast to the approach adopted in previous reviews and by other European regulators.[545]

Our reasoning

7.59 We recognise that competitive market conditions are not uniform within each of Area 2 and Area 3. We are looking to group together areas in which competitive conditions are sufficiently homogeneous. Defining geographic markets is a difficult undertaking because conditions of competition vary across the UK and will continue to change. Furthermore, our network build coverage data is imperfect, not least because it takes account of future build plans, which may evolve. We have taken into account the likely competitive conditions in different parts of Area 2, and use our experience and regulatory judgment to

[541] [✂], p.2-3; PAG, paragraph 6.2; TalkTalk, paragraph 1.19, in their responses to the January 2020 Consultation.
[542] BT Group response to January 2020 Consultation, paragraphs 2.43 to 2.47.
[543] UKCTA response to January 2020 Consultation, paragraphs 36 to 45.
[544] TalkTalk response to January 2020 Consultation, paragraphs 3.6 to 3.11, 4.90 and 4.91-4.96.
[545] Vodafone response to January 2020 Consultation, Part 1, paragraph 3.24 and Part 2, paragraphs 3.2-3.3.

apply a degree of approximation.[546] We recognise that competitive conditions will not be identical across Area 2, but we consider they are sufficiently similar that we can group these areas together for the purpose of market definition.

7.60 This review period will see substantial expansion by important competitors, with competition in the delivery of new networks, and it is clear that when defining markets we need to take a forward look over the review period. We have therefore not subdivided markets based on existing and planned presence.

7.61 We have set out above the reasons why CityFibre and Virgin Media are each likely to pose material and sustainable competition to Openreach, so we have not subdivided Area 2 based on the Virgin Media footprint.

7.62 In response to stakeholder comments that we have overstated competition in parts of Area 2, we consider that the evidence supports the potential for material and sustainable competition across this area. In addition to the degree of constraint posed by each of Virgin Media and CityFibre individually, we have also noted above that we expect that much of Hyperoptic's 5m planned build will be in Area 2. In addition, the scale of CityFibre's latest build plans suggests overlap with Virgin Media. CityFibre has stated in internal documents that it plans to [✂].[547] We consider that the impact on competitive market conditions will not be limited to these overlap areas. We note that ISPs have told us that they need commercial arrangements that support a consistent retail offer and long-term strategic objectives.[548]

7.63 Finally, as we explain above, we define Area 2 as areas in which there is, or there is likely to be potential for, material and sustainable competition. This does not equate to effective competition such that Openreach would necessarily face two scale competitors and therefore be unlikely to have SMP. We recognise that the extent to which parts of Area 2 will eventually become effectively competitive is uncertain.

Our decisions

7.64 We have therefore decided that Area 2 comprises postcode sectors that are in our view sufficiently homogeneous in competitive market conditions for the purposes of our SMP assessment and application of remedies. We do not think it is appropriate to subdivide Area 2. Throughout Area 2 there is, or there is likely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks. Our judgment is that competitive conditions are sufficiently similar within Area 2, and sufficiently different to Area 3.

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[546] *TalkTalk Telecom Group plc and Vodafone Limited v Ofcom (BCMR 2019)* [2020] CAT 8, paragraphs 229-232 and 293-296.
[547] CityFibre response dated 18 August 2020 to s.135 notice dated 21 July 2020, question 3.
[548] [✂] response to January 2020 Consultation, paragraph 4.136; and [✂] response to the January 2020 Consultation, page 2.

Methodology

Methodology for defining Area 1

7.65 In the January 2020 Consultation, we considered defining an Area 1 market – postcode sectors where there are at least two established rival networks to BT – but did not identify any such areas.

7.66 Axione states that it believes we ought to define Area 1 as "where it is likely to be viable to deploy and operate three or more full-fibre networks, regardless of who the network operators are".[549]

7.67 UKCTA thought that our approach to Area 1 is inconsistent with Areas 2 and 3, as it does not take into account prospective build.[550]

7.68 In principle, we agree with Axione that in defining Area 1 we should be agnostic about who the operators are, and that we will need to see how competition performs in practice in taking any future decision in defining Area 1. However, we have only identified two operators so far that we believe are likely to provide material and sustainable competition to BT.

7.69 We do not agree with Axione's and UKCTA's suggestion that we should define Area 1 on the basis of prospective build. We are likely to deregulate, or at least significantly reduce regulation in, Area 1, and it would be risky to do this on the basis of prospective build. In addition to the uncertainty of prospective build plans we would be concerned about the time it could take for an operator to build a network and become established. We will capture any such build in future reviews after it has occurred.

Ofcom should define markets based on an assessment of where build may be viable

7.70 CityFibre and INCA said that we should revert to the cluster analysis approach of defining Area 2 that we had previously proposed in our December 2018 Consultation (i.e. we seek to predict which geographic areas might have the potential for rival build, rather than relying on actual plans).[551] As part of this, CityFibre stated that we should look at commercially attractive parts of Area 3 and move them to another market.[552] Jurassic Fibre and Swish Fibre stated that we should conduct our own analysis of areas suitable for commercial build.[553] County Broadband commented that simply using the most immediately available operator deployment plans does not determine where deployment

[549] Axione response to January 2020 Consultation, paragraph 4.4.
[550] UKCTA respone to January 2020 Consultation, paragraph 49.
[551] In our December 2018 Consultation, we had proposed using a 'cluster analysis' modelling approach to identify and include geographic areas in which there might be economic incentives for rival networks to build (based on our analysis of the size of areas and density of premises), notwithstanding that these areas did not feature in operators' roll-out plans. However, in the January 2020 Consultation, we re-considered this approach as we considered it may be somewhat speculative. We therefore proposed that relying on operator build plans would better capture likely future build. See Ofcom, 2018. *Consultation: Promoting investment and competition in fibre networks* (December 2018 Consultation). CityFibre, paragraphs 3.102-3.105; and INCA, paragraph 53, in their responses to the January 2020 Consultation.
[552] CityFibre paragraphs 3.1072 – 3.114 in their response to the January Consultation.
[553] Jurassic Fibre, paragraphs 11-13; and Swish Fibre, paragraphs 14-20, in their responses to the January 2020 Consultation.

may be economic.[554] Axione suggested that we should use transparent parameters including the cost per premises passed and connected to define the boundary between the three areas.[555] Virgin Media said we may be underestimating build by only including existing coverage and known, geographically-defined build plans.[556]

7.71 As explained in the January 2020 Consultation, we consider that taking account of companies' planned build provides more certainty as to the locations which are likely to have the potential for material and sustainable competition over the review period than seeking to predict this ourselves (particularly as we are using only Virgin Media's and CityFibre's plans to define the boundary).

7.72 In common with other network operators, Virgin Media's and CityFibre's build plans are determined with reference to a number of parameters and informed by detailed surveys.[557] We consider that for us to second-guess these commercial decisions would be less reliable than basing our analysis on the plans that CityFibre and Virgin Media have developed over a number of years.

7.73 In the January 2020 Consultation, we said that we would reconsider using predictive analysis to define Area 2 if we found that network build plans had not been delivered and/or were unstable. However, this has not been the case. Over the year to June 2020, Virgin Media completed build to [✂] premises, and CityFibre's network passed nearly [✂] premises, [✂].[558] In addition, we verified that Virgin Media's overall forecast of premises passed within the review period is broadly unchanged from that reported to us in 2019, after accounting for actual build in the intervening period ([✂]). CityFibre confirmed that there have been only minor changes within their original 5 million build (see Annex 3).[559]

Implementation of our approach

7.74 A number of steps and decisions need to be taken in order to practically implement a geographic market boundary. In particular:

- **Geographic unit:** at what level of geographic granularity should the assessment be conducted?
- **Coverage threshold:** what percentage of premises within a geographic unit does an operator need to cover in order to be considered as present?

[554] County Broadband response to January 2020 Consultation, paragraph 6.
[555] Axione response to January 2020 Consultation, paragraph 4.5.
[556] Virgin Media response to January 2020 Consultation, paragraphs 57-60.
[557] In our December 2018 Consultation, we discussed certain considerations that were common to operators building or extending fibre networks. These included the cost and pace of build (which included many elements such as proximity to existing network, size of area, density of premises, surface types, availability of third party assets, cost and availability of labour), predicted penetration (based on demand, demographics and existence of competitive products, etc.) and local authority support (the degree of cooperation or resistance the local authority would add to the programme and if any additional charges would be levied for permit schemes adding to the cost to build) (paragraph 3.46).
[558] Includes [✂] build from FibreNation which CityFibre has acquired, but which was still counted separately in Connected Nations 2020.
[559] See CityFibre response to the s135 notice dated 15 October 2020, question 1 and Virgin Media response to the s135 notice dated 20 August 2020.

- **Modelling the evidence:** how should we process the information on existing network and build plans that we have obtained from operators?

Geographic unit

7.75 We proposed using postcode sectors as our geographic unit of assessment. We considered that postcode sectors are: well-established, relatively stable and strike a good balance between being granular enough to capture the competitive dynamic but not so granular that they are impracticable. There are around 10,000 postcode sectors in the UK, with an average of 3,000 premises in each.[560]

Stakeholder responses

7.76 TalkTalk and UKCTA said that we should be using more granular units of analysis than postcode sectors.[561] TalkTalk said that postcode sectors are too coarse for competitive conditions to be sufficiently homogeneous within each postcode sector for the same SMP assessment and remedies to be appropriate, especially in rural areas, where postcode sectors can be large, and on the boundaries of towns, where they can encompass a range of competitive conditions. TalkTalk stated that we could carry out the analysis at a postcode level by using coverage data at the postcode level for existing networks and assuming that the network will cover all postcodes within the postcode sector unless informed otherwise by the altnet building the network.[562]

7.77 UKCTA said that postcode sectors are insufficiently homogeneous, especially in rural areas. They argued that we have not cited evidential support for our current proposal. They considered that the most appropriate alternative approach would be to use full postcodes, which would be more granular while remaining tractable.[563]

Our reasoning and decisions

7.78 We accept that when premises are aggregated into larger units there is a risk that the competitive conditions within the unit become less homogeneous. However, it is not practical to carry out the analysis at a premises level.[564] Some level of aggregation will therefore be necessary. The level of aggregation used is a matter of judgment and trades off precision with practicality.

7.79 We do not consider the use of postcodes is practicable. There are around 1.6m postcodes, with an average of around 20 premises in each, and many postcodes are added and removed each year. In any case, we do not think it is practical to try to assess prospective network competition five years hence at such a granular level.

7.80 We believe that postcode sectors represent a good balance between precision and practicality. Their use results in us breaking up the UK into c.10,000 units for the purpose

[560] 'Premises' includes residential and commercial.
[561] TalkTalk response to January 2020 Consultation, paragraph 4.41; UKCTA response to January 2020 Consultation, paragraph 19.
[562] TalkTalk response to January 2020 Consultation, paragraphs 4.41-4.45.
[563] UKCTA response to January 2020 Consultation, paragraphs 19-20.
[564] See paragraph 49 of the EC SMP Guidelines, to which we may have regard.

of this assessment. We have previously used postcode sectors in our analysis of the leased lines market.

7.81 It therefore remains our view that it is appropriate to use postcode sectors as the geographic unit.

Coverage threshold

7.82 We proposed using a coverage threshold of 50%. This means that an operator will be considered as present in a postcode sector if its network covers at least 50% of the premises in that postcode sector.[565]

Stakeholder responses

7.83 INCA agreed with our use of a 50% threshold. It agreed with applying the 50% threshold because it is likely that altnets will extend their initial networks to cover additional adjacent locations and this would take altnet network coverage up to much higher percentages.[566]

7.84 Several respondents said the 50% threshold is not appropriate. TalkTalk said it was too low for operators to act as an effective competitive constraint on Openreach and make a small but significant increase in price unprofitable (i.e. that it would fail a SSNIP test).[567] Vodafone [568] and UKCTA [569] said Openreach could profitably raise wholesale prices in an area even if a rival had only connected 50% of premises. Vodafone said it would be appropriate to consider a SSNIP test to define the threshold and suggested that the threshold needs to be set above 60% for Openreach not to see a net benefit from rising prices.[570] UKCTA suggested a threshold in the range of 60 -75% would be more appropriate.[571]

Our reasoning and decisions

7.85 We do not agree that satisfying a localised SSNIP test is the right benchmark for determining the boundary for Area 2. We are not seeking to define the geographic area where Openreach would no longer have SMP, and we accept that the presence of material and sustainable competition may not be sufficient to fully discipline Openreach's wholesale prices.

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[565] We note that the choice of coverage threshold – whether at 50% or 65% or 80% - is unlikely to be material for many postcode sectors. This is because, when an operator decides to deploy to a town or city, it will aim to pass several thousand premises across multiple adjacent postcode sectors. This means that most postcode sectors within the urban deployment are likely to see very high coverage and the area to which they are allocated will be insensitive to our choice of coverage threshold. Postcode sectors with lower coverage are likely to include those at the edge of urban areas where a postcode sector covers the town and more rural areas. Therefore, the coverage threshold is likely to be more determinative of postcode sectors with partial coverage, including those at the edge of an urban deployment.
[566] INCA response to January 2020 Consultation, paragraphs 55-58.
[567] TalkTalk response to January 2020 Consultation, paragraphs 4.66-4.71.
[568] Vodafone response to January 2020 Consultation, Part 1, paragraphs 3.30-3.32.
[569] UKCTA response to January 2020 Consultation, paragraphs 27-30.
[570] Vodafone response to January 2020 Consultation, Part 1, paragraphs 3.31-3.36.
[571] UKCTA response to January 2020 Consultation, paragraphs 27-30.

7.86 Moreover, the choice of coverage threshold is not driven by whether the operator provides an effective constraint within an individual postcode sector.[572] The implication of TalkTalk's and Vodafone's argument is that competition is happening at a very localised level. We do not believe that Openreach is generally likely to set different prices in different postcode sectors. TalkTalk's, Vodafone's and UKCTA's concerns are therefore misplaced.

7.87 The coverage threshold ensures that operators are properly represented in the assessment. If a very high coverage threshold is used then it is possible that many parts of an operator's network would be excluded, and consequently the operator would be under-represented. Conversely, if a very low coverage threshold is used then it is possible that an operator's network would be over-represented. The choice of a 50% coverage threshold is therefore reasonable, as on average any under or over-representation should balance out.

7.88 It therefore remains our view that it is appropriate to use a 50% coverage threshold.

Modelling evidence on existing networks and build plans

7.89 Having identified the relevant geographic unit and the coverage threshold, we need to process the existing and planned build data that we obtain from network operators to model their expected presence over the review period.

7.90 For the January 2020 Consultation, we used information gathered for our Connected Nations Summer 2019 report on the level of existing coverage by different network operators across the UK.

7.91 We also gathered information about future roll-out plans from CityFibre, FibreNation and Virgin Media, to include in our modelling.

7.92 We combined the Connected Nations coverage information with these future roll-out plans when determining whether these operators were present in a postcode sector. [573]

7.93 In some cases future roll-out plans were provided at a higher level of granularity than postcode sector (e.g. a town/city).[574] We therefore mapped these plans onto postcode sectors using our 'clustering' analysis, which we describe in Annex 4.

Stakeholder responses

7.94 TalkTalk stated that we assume a network which is 'in planning' or 'pending approval' will be built, even though it may not be completed in this review period.[575]

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[572] Rather, we consider the constraint provided by an operator across its entire footprint, and that will cover many postcode sectors.

[573] We have identified a modelling error in our analysis for the January 2020 Consultation. Instead of applying the 50% threshold to the postcode sector, we first applied a 65% threshold to premises in Virgin Media's footprint at a higher level grouping (the cluster level – a larger geographic unit than the postcode sector that is explained in more detail later in Annex 4). If Virgin Media was not present in a cluster at this threshold, we used a 50% coverage threshold at the postcode sector level based on existing build only. We have now corrected this error, which only affected a very small number of postcode sectors.

[574] January 2020 Consultation, Volume 2, paragraphs 7.26-7.32 and Annex 8, paragraphs A8.25-A8.41.

[575] TalkTalk response to January 2020 consultation paragraph 4.49.

7.95 TalkTalk also said that if the operator has only identified a town or city where it plans to build, we estimate where we think the network might be built, meaning that there may be a material divergence between actual build and our estimate of build.[576]

7.96 UKCTA said that our approach increases uncertainty by assuming build will happen before 2026 even where there is little more than a named city in a press or financial statement, without a timeline or detailed scope for the roll-out. They considered that we could reduce uncertainty by seeking further information.[577]

Our reasoning and decisions

7.97 All the planned roll-out used in the analysis we undertook for the January 2020 Consultation was expected to be complete before the end of the review period, and we have taken the same approach in our assessment for this statement. Although operators plan to complete this roll-out before the end of the review period, we accept that this is not a guarantee; there is always a level of uncertainty in forward-looking assessments.

7.98 Where we have needed to estimate the location of Virgin Media's future roll-out, we use our clustering analysis, explained in Annex 4.[578] We accept that this introduces an additional degree of approximation. However, we believe that this additional approximation is small, as we have been provided with information corresponding to parts of towns and cities Virgin Media plans to roll out to and the extent of the roll-out. Our estimate is therefore reasonably well bounded. Moreover, the total amount of roll-out that we have needed to estimate is quite small and its impact on the size of Area 2 is limited.

7.99 With regard to UKCTA's point, the information we have about CityFibre and Virgin Media build plans was provided in response to information requests made under our statutory powers, and we therefore think it is the best information available to us.

Outputs of modelling of Virgin Media and CityFibre presence

7.100 We set out updated results below on the presence of Virgin Media and CityFibre taking into account their existing network presence (Table 7.2) and likely future presence at 2026 (Table 7.3).

[576] TalkTalk response to January 2020 consultation paragraph 4.49.
[577] UKCTA Response to January 2020 consultation paragraph 42.
[578] This approach involves assessing areas where Virgin Media has planned build at a 'cluster' level and then mapping to postcode sectors.

Table 7.2: Summary of existing CityFibre and Virgin Media network presence in the UK, number of postcode sectors (pcs) and premises

Virgin Media and CityFibre network presence	Existing network presence	% of UK premises
Both	34 pcs 0.1m premises	0.4%
One	4,523 pcs 17.2m premises	55.8%
Neither	5,543 pcs 13.5m premises	43.8%

Source: Ofcom.

Note that the premises are the total number of premises in the postcode sectors where Virgin Media and/or CityFibre are deemed to be present, not the number of premises passed by the network/s.

All figures exclude 59 Hull postcode sectors.

Table 7.3: Summary of existing plus planned CityFibre and Virgin Media network presence in the UK, number of postcode sectors (pcs) and premises

Virgin Media and CityFibre network presence	Existing plus planned network presence	% of UK premises
Both	1,718 pcs 6.9m premises	22.3%
One	4,361 pcs 14.8m premises	47.9%
Neither	4,021 pcs 9.2m premises	29.8%

Source: Ofcom, figures may not sum due to rounding.

Note that the premises are the total number of premises in the postcode sectors where Virgin Media and/or CityFibre are deemed to be present, not the number of premises passed by the network.

All figures exclude 59 Hull postcode sectors.

7.101 Currently, we find that either CityFibre and/or Virgin Media are present in 4,557 postcode sectors (56.2% of UK premises). This existing coverage is largely Virgin Media which is present in ([✂] of these postcode sectors, [✂] of UK premises).

7.102 Including planned build, there would be 6,079 postcode sectors (70.2% of UK premises) where we expect CityFibre and/or Virgin Media to be present by 2026.

Identification of WLA geographic markets

7.103 We now delineate the WLA geographic markets using the results of our modelling.

Area 3

7.104 Area 3 comprises postcode sectors in which there is not, and there is unlikely to be potential for, material and sustainable competition to BT. As discussed above, this equates to postcode sectors where neither Virgin Media nor CityFibre is present based on their existing and planned build over the review period.

7.105 Based on the results of our modelling, Area 3 represents 39.8% of UK postcode sectors and 29.8% of UK premises.

Area 2

7.106 Area 2 comprises postcode sectors in which there is, or there is likely to be potential for, material and sustainable competition to BT. As discussed above, this equates to postcode sectors where either Virgin Media or CityFibre, or both, have existing or planned presence in this review period.

7.107 We find that Area 2 represents 60.2% and 70.2% of UK postcode sectors and premises respectively.

Table 7.4: Size of Areas 2 and 3

Area	Postcode sectors and % UK premises[579]
2	6,079 PCS 70.2% of UK premises
3	4,021 PCS 29.8% of UK premises

Source: Ofcom.

Area 1

7.108 In our January 2020 Consultation we identified that two rival networks to BT were present in 15 postcode sectors across the UK (0.2% of total premises).[580] We considered whether conditions of competition in these postcode sectors were sufficiently different from Area 2 that we should define a separate market (Area 1), but we proposed that they were not.

[579] Excluding the Hull Area.

[580] January 2020 Consultation, Volume 2, Table 7.2. The majority of these postcode sectors were in parts of York or Bournemouth where Virgin Media has an established presence. In York, FibreNation had an ongoing fibre network build project and, in Bournemouth, CityFibre had acquired a small fibre network some years before which they were working on expanding and incorporating into their city-based roll out scheme.

7.109 Since then, the number of postcode sectors where we calculate that two rival networks are present has increased by 19, to 34 postcode sectors (0.4% of total UK premises).[581] This increase reflects CityFibre's roll out in cities where Virgin Media is already present.

7.110 As discussed above, if we are to define an Area 1 market, we consider it appropriate to do so on the basis of existing network presence, rather than on the basis of prospective build.

7.111 While there is clearly potential for competition to grow substantially during this review period, as at May 2020, more than half [✂] of all connections across these 34 postcode sectors remained on the Openreach network. CityFibre's share was under [✂].

7.112 Although we are encouraged by the progress in the roll-out of competing networks, it is too early to draw firm conclusions about the incremental competitive impact that a second rival network will bring. This is also likely to be limited while the scale of build remains small and geographically spread out.

7.113 Our decision is therefore that competitive conditions in these postcode sectors are not sufficiently distinct from those in other postcode sectors in Area 2 for us to define a distinct Area 1 market for WLA in this review. We therefore include these 34 postcode sectors in Area 2.

Conclusion on market definition for WLA

Application of the three criteria test

7.114 In this subsection, we consider whether the three criteria set out in section 79(2B) of the Act are met in relation to the WLA markets.

7.115 As set out in Annex 1, in determining whether to identify a market for the purpose of making a market power determination, we must consider whether the three criteria set out in in subsection 79(2B) of the Act are met. Where we do not consider that the three criteria are met, we may not identify a market for this purpose.

7.116 In identifying a market, we may have regard to various recommendations or guidelines published by the European Commission, and guidelines published by BEREC, including the 2020 EC Recommendation. The WLA market is listed in the 2020 EC Recommendation as a market in which *ex ante* regulation may be warranted.[582]

7.117 Our January 2020 Consultation pre-dated the entry into force of section 79(2B) of the Act. However, we proposed *ex ante* regulation of our proposed WLA markets, as we concurred with the view set out in the (then applicable) 2014 EC Recommendation[583] that the three criteria would in general be met in relation to wholesale local access markets.[584] As part of

[581] Ten postcode sectors are in York. The others are in Bournemouth (six postcode sectors), Brighton (one postcode sector), Coventry (six postcode sectors), Harrogate (one postcode sector), Peterborough (six postcode sectors), and Southend on Sea (four postcode sectors).
[582] It corresponds to market 1 – wholesale local access provided at a fixed location.
[583] At the time, we were required to take utmost account of the 2014 EC Recommendation.
[584] Subject to considering whether specific competitive conditions might justify the removal of regulation on a sub-national basis (see Explanatory Note to the 2014 EC Recommendation).

this review, we have assessed whether this continues to be the case for the criteria set out in subsection 79(2B) of the Act.

7.118 In some of the markets we are reviewing, including WLA, we expect an increase in competition in certain areas of the UK, but not in others, leading us to define sub-national markets. However, we consider it appropriate to assess the three criteria at a more general level, taking into account overall characteristics and structure in the relevant product market, and to leave the assessment of competition at a sub-national level to our SMP assessment. We approach the three criteria test for WLA on this basis.

High and non-transitory barriers to entry

7.119 As set out in Section 8, barriers to entry and expansion can exist in the WLA markets arising from the cost of constructing a significant scale local access network and from the existence of high sunk costs in establishing coverage across an area. There are significant economies of scale because once the high fixed cost of investment in network build has been sunk, the marginal cost of connecting an individual premise is relatively low.

7.120 We expect the unrestricted PIA remedy in the upstream physical infrastructure market to substantially reduce the sunk costs of network build, but the extent and timing of this is uncertain. There are also other factors that could present some challenges or create uncertainties for the roll-out of rival networks across the UK, and in some parts of the UK low density of premises will remain a challenge. We discuss these in Section 8.

7.121 Accordingly, high and non-transitory barriers to entry are likely to persist in WLA markets at a national level. Where barriers are likely to be lower in sub-national markets, we take this into account in our SMP assessment.

A market which does not tend towards effective competition

7.122 We assess competitive conditions in WLA markets in Section 8 below. In summary, BT retains a high share of active connections across all parts of the UK. The evidence we have suggests that there will be substantial investment in fibre and gigabit-capable network build to rival BT during the review period and beyond, particularly in certain parts of the UK. However, the competitive outcome of this investment is uncertain, and the potential for competition is assisted by the existence of continued WLA regulation. In other parts of the UK, we do not anticipate the emergence of material and sustainable competition to BT.

7.123 Accordingly, we do not consider the market will tend towards effective competition at a national level. We take account of increasing competition at a sub-national level in our SMP assessment.

Insufficiency of competition law

7.124 We set out in Section 8 our competition concerns arising from BT's SMP in WLA markets. Absent regulation, BT's SMP would give it the incentive and ability to engage in forms of conduct that could distort competition and/or harm consumers. These forms of conduct fall into two broad categories:

- Exclusionary behaviour to prevent potential rival networks from competing in the wholesale access market or gaining market share, which could lead to competitors being excluded from the market, in the long-run leading to poorer outcomes for end-customers.
- Exploitative behaviour by BT at the expense of its wholesale access customers, who compete in the retail market, and therefore ultimately end-users (including higher prices, poorer quality services and less innovation and investment).

7.125 Competition law, in particular the rules prohibiting the abuse of a dominant position, is an important part of the legal framework that BT needs to comply with. Given its position of SMP (which equates to the competition law concept of dominance) BT has a special responsibility not to allow its actions on the market (where conditions of competition are weak) to distort or impair competition.

7.126 However, we consider that competition law remedies would be insufficient to address the identified competition concerns on their own in this context.

- First, competition law would focus on tackling the abuse of a dominant position and would not be as effective as *ex ante* regulation in promoting and protecting competition from rival networks in the WLA market and in downstream retail markets.
- Second, regulation must remain effective for the review period, and *ex ante* regulation better enables us to do this as it can be tailored to the particular circumstances in the markets and services provided.
- Third, competition law does not provide enough regulatory certainty, which itself can undermine competition – and regulatory certainty is important in encouraging long-term investment in competing networks. In contrast, a benefit of *ex ante* regulation is that all industry stakeholders are clear in advance on the regulation that will apply.
- Fourth, *ex ante* regulation can facilitate more timely enforcement due to the greater certainty and specificity provided. Although significant fines can be levied for breaches of competition law, which do have some reputational and commercial implications, cases often take considerable time, by which point the damage to competition may be irreversible.

7.127 On that basis, while competition law enforcement may be used in appropriate circumstances, we do not consider that it would be sufficient to rely on it alone and so consider that *ex ante* regulation is required.

Conclusion on the application of the three criteria test

7.128 We consider that the three criteria test set out in section 79(2B) of the Act is met in relation to WLA markets.

Decision on market definition

7.129 We have therefore decided to identify the following markets for WLA for the purposes of making a market power determination:

- WLA Area 2 – postcode sectors in which there is, or there is likely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks; and
- WLA Area 3 – postcode sectors in which there is not, and there is unlikely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks.

Geographic market definition for LL Access

Our proposals

7.130 In the January 2020 Consultation we said that we considered that Virgin Media and CityFibre would provide a competitive constraint in both the WLA market and the LL Access market. This was because the networks owned and being built by these operators were intended to provide both broadband and leased line services. Our starting point was therefore, to use the same boundary between Area 2 and Area 3 in both the WLA market and the LL Access market.

7.131 However, we recognised the need to also take account of the impact of leased line only networks on the competitive conditions in certain areas. We proposed to carve out separate geographic areas where the presence of leased line only networks means that BT already faces competition from two or more competing networks (i.e. areas of high network reach). We considered that the presence of leased line only networks sufficiently altered competitive conditions in these geographic areas to define two separate geographic markets. We considered the CLA to be a particularly distinct geographic area with a high density of large businesses and operators. We proposed to group together the remaining HNR areas into a single market.

7.132 We used our network reach model to determine the boundaries of our proposed CLA and HNR markets (we had previously used this model for 2019 BCMR).[585] As in the WLA market, we proposed to use postcode sectors as our geographic unit of analysis. We explained that, when we assess the presence of leased line only networks, we measure their proximity to a database of demand site locations, as proximity is the key driver of competition.[586] Our metric for measuring whether BT faced two or more competitors in a postcode sector ('BT+2') was whether 65% of business sites in a postcode sector were within 50 metres of at least two competing networks.[587]

7.133 We recognised that this approach to determining geographic market boundaries involves a degree of approximation, and there are likely to be some variations in competitive

[585] See Annex 5 for further description of this model.
[586] "Demand sites" includes large business sites, data centres and mobile cell sites, see Annex 5 for further detail.
[587] The evidence in the BCMR 2019 suggests that operators would be able to compete where they had an existing fibre or duct connection into a building or the distance that the operator would have to dig was very short (e.g. <20 metres). See Ofcom, 2019. *Statement: Promoting competition and investment in fibre networks – review of the physical infrastructure and business connectivity markets,* Vol.2 (2019 BCMR), paragraphs 5.46-5.91.

conditions in the markets that we define. However, we considered that our proposed approach sufficiently captured the main differences in competitive conditions. Underpinning our approach in the January 2020 Consultation was our view that we did not think it would be practicable or proportionate to attempt a more granular analysis, and that using postcode sectors as our unit of analysis strikes a good balance between granularity and practicality.

Stakeholder comments, our reasoning and decisions

7.134 In this section, we summarise and address stakeholder comments on the following points:

- defining the HNR and CLA markets;
- defining the boundary between Area 2 and Area 3;
- homogeneity of competitive conditions within Area 2;
- homogeneity of competitive conditions within Area 3;
- mobile backhaul; and
- modelling assumptions.

Defining the HNR and CLA markets

7.135 Vodafone said that information presented during the 2019 BCMR appeal process made it clear that the current geographic market boundaries around the CLA and HNR are erroneous, as infrastructure network coverage and customer characteristics were not uniform over the whole area.[588] Vodafone proposed a more granular demand and supply side analysis of these geographic areas.[589]

7.136 BT Group stated that the CLA is highly competitive and must remain deregulated. They note that PIA will make it easier for others to build full fibre in competition with Openreach.[590]

Our reasoning and decisions

7.137 There are substantially more alternative networks to BT in the CLA and HNR Area than in other parts of the UK. We estimate that the average number of competing networks within 50m of demand sites is 5.1 in the CLA and 2.4 in the HNR Area.[591] This compares to an average of 0.9 in Area 2 and 0.2 in Area 3.

7.138 We think it is right to set the boundaries for these markets primarily by reference to our modelling of existing networks. We use these markets to evaluate whether BT has SMP,

[588] Vodafone response to January 2020 Consultation, Part 2, paragraph 3.46.
[589] Vodafone response to January 2020 Consultation, Part 2, paragraph 3.53.
[590] BT Group Response to January 2020 Consultation, paragraph 1.3. BT also said that the threshold we used in our network reach analysis in the January 2020 Consultation was significantly above the threshold that we used in the BCMR 2019 Statement for finding an area to "*have the potential to support effective competition*" (BT Group Response to the January 2020 Consultation, paragraph 2.128). In BCMR 2019, we said "*We consider that High Network Reach postcode sectors (i.e. postcode sectors with at least two rival networks present) may have the potential to support effective competition*" (BCMR 2019 Statement, Volume 2, paragraph 5.98). We remain of this view and note in Section 8 that there is the potential for areas of HNR to emerge as fully competitive in future review periods, but they are not yet effectively competitive.
[591] See modelling results Table 7.6.

which we ultimately find to be a balanced decision in the case of HNR areas and we conclude that BT does not have SMP in the CLA. Including planned build in our modelling would result in broader markets in which competition depended to a greater extent on uncertain future developments.[592] In addition to the uncertainty of prospective build plans, we would be concerned about the time it could take for an operator to build a network and become established. However, we supplement our modelling with a qualitative consideration of the information we have obtained from operators on planned build to ensure that, looking forward to the end of review, both the similarity of competitive market conditions within these areas, and the differences with other areas, will remain. We will also capture any new network build in our modelling in future reviews after it has occurred.

7.139 We agree with BT Group that PIA has the potential to substantially increase competition in LL Access, by extending the range over which existing networks will be able to compete. However, use of PIA remains in its early stages, and we do not yet know how far and on what timescale PIA might expand the effective reach of existing networks. We think it is more appropriate to take account of the impact of PIA in our SMP assessment for the HNR areas, rather than amending the geographic boundary.

7.140 Our BT+2 network reach metric is a reasonable basis for drawing the boundary for these areas. We recognise that our metric involves a degree of approximation, and that there may be some business sites within the BT+2 areas that do not have alternatives to Openreach very nearby. Situations such as this will become less likely in the future as use of PIA to extend networks expands. As in previous BCMR reviews we do not consider that a more localised assessment, possibly by individual premises, of competitive market conditions is practical or proportionate.[593]

7.141 There are variations in the degree of rival infrastructure within the BT+2 areas. In some parts, businesses will have proximity to many more than two networks, and competition to serve them may be substantially greater than the average for that area and across BT+2 areas. However, we consider that conditions of competition within our boundaries are sufficiently homogeneous that no further subdivision of the markets is appropriate:

- Our separation of the HNR Area from the CLA captures the main difference within BT+2 areas. The density of competing infrastructure is of an order of magnitude greater, and the median dig distance is lower, in the CLA than in the HNR Area (see Annex 5). Separating the CLA and the HNR Area allows us to reflect this difference by reaching a different finding with regard to SMP for the CLA.
- We have looked at the variation in network coverage between different parts of the HNR Area. At Table 7.5 we present results for the largest metropolitan areas (in terms

[592] In addition, we are unable to build a complete picture of planned build into our model as many operators could not provide us with the necessary data.
[593] We also recognise that there may be postcode sectors that fall just above or below our BT+2 metric, and that these may not appear very different on closer inspection. That is inevitable where we need to define a boundary in circumstances where the degree of rival network across areas is a continuous variable, rather than necessarily conforming to clear and discrete differences.

of the number of HNR postcode sectors) as well as the rest of the HNR postcode sectors, which show that the average number of competing networks 'present' (within 50m of demand sites) in each of these subsets of the HNR Area ranges between 2.1 – 3.0. Looking at the percentage of businesses in each of these areas that have access to two or more providers, in each subdivision more than 70% of demand sites have access to two or more providers. This supports our view that existing network coverage is sufficiently homogeneous across the HNR Area.

- We have also considered the variation in network coverage across the CLA. Within the CLA, there are no BT Only postcode sectors and 12 BT+1 postcode sectors.[594] We have analysed each of these 12 BT+1 postcode sectors. In 11 of them, the average distance to the second closest rival is less than 50m. For the remaining one, we find that the distance is longer, but that this result is likely to be anomalous because this is a larger postcode sector than the other 11. In addition, across all 12 of these, the average distance to the second closest rival is 51m.[595] We therefore consider that conditions across the CLA are broadly similar.
- Our market assessment is forward looking and we recognise that localised coverage will evolve, especially through the increasing use of PIA, but that the location, speed and extent of the evolution is uncertain. Attempting to further subdivide these markets to reflect existing variations may not capture these dynamics well.

7.142 We agree with Vodafone that there is some variation in network coverage within the CLA and HNR Area boundaries. However, for the reasons given above, we do not think these variations are sufficiently large to require further subdivisions of the HNR Area or the CLA.[596]

Defining the boundary between Area 2 and Area 3

7.143 Several respondents disagreed with our approach to defining the boundary between Area 2 and Area 3 in the LL Access market.

7.144 BT Group said that we must specifically assess the boundaries of the LL Access market (and not align our assessment with that for the WLA market), so as to include leased lines specific network rollout.[597]

7.145 TalkTalk [598] said that we had not justified the use of two different methods to define different parts of the market, and that the proposed approach seems designed to force consistency between the geographic markets for WLA and leased lines. It said such an approach is incompatible with the requirement for market analysis to be objective, and that we do not have regulatory and policy discretion on this point.

7.146 Telefonica said that the approach we have followed in delineating Area 2 and Area 3 leads to the inclusion in Area 2 of postcode sectors that would be more appropriately

[594] Annex 5 explains how we categorise postcode sectors as BT Only, BT+1, etc.
[595] These metrics are set out in full in Annex 5.
[596] See paragraph 7.59 above for an explanation of how we approach the question of homogeneity.
[597] BT Group response to January 2020 Consultation, paragraphs 2.81 to 2.92.
[598] TalkTalk response to January 2020 Consultation, paragraphs 7.39-7.44.

categorised as part of Area 3. They said that we should not be using build plans and that using the same boundary for splitting Area 2 from Area 3 means applying a 50% threshold, which is too low. These issues come from using the same model to delineate Area 2 and Area 3 for WLA and LL Access. [599]

7.147 Vodafone said that our approach to defining Area 2 and Area 3 stems from a desire for administrative convenience and is not compatible with properly identifying and grouping potential geographic competitive variations.[600]

7.148 Vodafone also stated that Virgin Media's network is largely broadband specific and that its leased lines network is geographically distinct, meaning that it would need to carry out network extensions to supply leased lines in many cases.[601]

Our reasoning and decisions

7.149 We have decided to use the same boundary between Area 2 and Area 3 for LL Access as for WLA services.

7.150 In terms of the Area 2 LL Access geographic market, we are taking a forward-looking approach to identifying areas where there is likely to be the potential for material and sustainable competition in the commercial deployment of competing networks. Outside of the CLA and HNR Area, this will mainly be driven by Virgin Media's and CityFibre's current and planned networks. On the basis of the evidence set out at paragraphs 7.40 and 7.41, we think that there is potential for material and sustainable competition arising in areas covered by the Virgin Media and/or CityFibre networks, in both WLA services and LL Access services. As the footprints of these networks will be the same for both WLA services and LL Access services, we believe that the use of common geographic boundaries for these markets is both reasonable and practical.

7.151 We think the best way to determine the boundary between Area 2 and Area 3 is by reference to network coverage, using the approach described in detail at Annex 4. We considered and rejected the potential for adapting our network reach model to set the boundary between Area 2 and Area 3. That model is designed to evaluate leased line coverage of existing networks. The approximations used for our network reach metrics become more significant in less densely populated areas with relatively fewer demand site locations.[602] There are also challenges in integrating network plans to this model, particularly Virgin Media were unable to provide the required granular information in relation to planned build.

7.152 While the WLA analysis does not explicitly model the granular proximity of these networks to sites where leased lines are demanded, we think it is a reasonable basis for capturing

[599] Telefonica response to January 2020 Consultation, paragraphs 4.4-4.9.
[600] Vodafone response to January 2020 Consultation, Part 2, paragraphs 3.3 and 3.4.
[601] Vodafone response to January 2020 Consultation, Part 2, paragraph 3.28.
[602] 2019 BCMR Statement, Volume 2, paragraph 5.51 The approximations used in our network reach model are explained in more detail in Annex 5.

the geographic areas where there is potential for material and sustainable competition in LL Access (outside the CLA and HNR Area).

7.153 In all postcode sectors that are included in Area 2, either Virgin Media and/or CityFibre will have sufficient existing or planned coverage to supply at least 50% of premises. This will provide coverage for many businesses in most areas.

7.154 It is possible, as some stakeholders have suggested, that there will be some locations where Virgin Media's or CityFibre's coverage serves residential premises well but is less close to businesses. We think that our boundary is appropriate notwithstanding this possibility.

- In CityFibre's case, the network is being designed to generate revenue from leased lines, supporting our view that in areas where CityFibre has coverage it will generally be well placed to supply LL Access to businesses.[603]
- We expect that Virgin Media's network will usually serve LL Access reasonably well where it has coverage.[604] We have sense-checked this by looking at Virgin Media's existing LL Access network reach in those postcode sectors where our WLA connections model shows Virgin to be 'present' on the basis of existing connections. We find that in over 97% of these postcode sectors there is competing network presence within 100m of 50% of demand sites.[605]
- The potential for PIA to extend the effective reach of networks in supplying leased lines mitigates this concern. While the extent and timing of PIA is uncertain, it clearly has potential to substantially increase competition in LL Access over the course of this review.

7.155 Finally, market definition is intended to inform our SMP assessment. It is clear that modest changes in the geographic market boundary between Area 2 and Area 3 would not affect our finding that BT has SMP in both areas. In addition, even if we were to draw the geographic market boundary between Area 2 and Area 3 slightly differently for LL Access than for WLA, we would be likely to use the same boundary for the purposes of setting remedies.[606] This is because our strategy is to support new gigabit capable networks that will deliver both WLA services and LL Access, and the remedies for both of these markets help support that network build. Accordingly, it is unlikely that there would be practical

[603] CityFibre told us that its network architecture has been designed to support multiple types of products for residential, small to medium-sized enterprises, corporate enterprise and public sector customers (See CityFibre response dated 1 September 2020 to s.135 request dated 21 July 2020, question 6).
[604] Virgin Media told us that, generally, leased line products can be supplied on competitive terms to sites passed by its access network (see Virgin Media response dated 8 September 2020 to s135 dated 22 July 2020, question 5).
[605] Using the 50m buffer distance and 65% coverage threshold that we use for setting the HNR Area and CLA boundaries would mean that rival network presence is found in 84% of these postcode sectors, still the large majority. We also sensitivity tested using a 50m buffer distance and 50% threshold, where rival network presence was found in 93% postcode sectors, and 100m buffer distance and 65% threshold, where rival network was found in 94% of postcode sectors. We consider that this rival network is likely to be largely Virgin Media because leased line only presence outside of the CLA and HNR Area is likely to be limited.
[606] There is no requirement that the geographic delineations for remedies necessarily needs to follow the geographic delineations for markets, so long as SMP is present in all of the relevant geographic markets identified.

implications from drawing a slightly different boundary for LL Access than for WLA, other than to add unnecessary complexity.

7.156 For these reasons we think it is appropriate to use the same boundary to distinguish Area 2 from Area 3 for WLA services and for LL Access, and that it is right to use the WLA modelling to set this boundary.

Homogeneity of competitive conditions within Area 2

7.157 [✂] said that Area 2 is inappropriately wide and should be split into three areas.[607] TalkTalk said that areas with different competitive conditions are grouped together, for example, in Area 2.[608]

7.158 Telefonica stated that Area 2 is very wide with a variety of competitive conditions, and suggested subdividing Area 2 based on whether there is one established rival or not.[609]

7.159 Vodafone said that the geographic markets Area 2 and Area 3 are not uniformly homogeneous locations, and that there is evidence that Area 2 has a wide divergence of competitive conditions across its localities. For example, 35% of premises in Area 2 have no alternative choice of leased line supplier within 50m and therefore the supply characteristics for this proportion of Area 2 align with those of Area 3.[610]

Our reasoning and decisions

7.160 We recognise that competitive market conditions are not completely uniform within Area 2. Our objective is to group together areas in which competitive conditions are sufficiently homogeneous, not those that are precisely the same.

7.161 This review period will see substantial expansion by important competitors in Area 2, with competition in the delivery of new networks, and it is clear that when defining markets we need to take a forward-look over the review period. We have therefore not subdivided markets based on existing and planned presence.

7.162 We have set out above the reasons why CityFibre and Virgin Media are each likely to pose material and sustainable competition to Openreach, so we have not subdivided Area 2 based on the Virgin Media footprint. As noted above and in previous BCMR reviews, we do not consider that a more localised assessment, possibly by individual premises, of competitive market conditions is practical or proportionate.

7.163 Accordingly, we recognise that competitive conditions will not be identical across Area 2, but we consider they are sufficiently similar that we can group these areas together for the purpose of market definition.

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[607] [✂] response to the January 2020 Consultation, question 7.1.
[608] TalkTalk response to January 2020 Consultation, paragraph 7.43.
[609] Telefonica response to January 2020 Consultation, paragraphs 4.10-4.15.
[610] Vodafone response to January 2020 Consultation, Part 2, paragraphs 3.40-3.41.

Homogeneity of competitive conditions within Area 3

7.164 Openreach said that our methodology for defining geographic areas has resulted in 33 postcode sectors where good levels of competition exist (or prospectively exist) being incorrectly categorised as Area 3. These postcode sectors include, for example, Heathrow Airport and Stockley Park business estate. They requested that we consider some overlay to the model to deal with these "exceptions".[611]

Our reasoning and decisions

7.165 We accept Openreach's point that there may be some parts of Area 3 where there are other providers of leased lines.[612]

7.166 However, as explained above, our test is whether competitive conditions are sufficiently homogeneous. It may be that some of these are instances where the approximations in our network reach modelling (which we use to identify areas of high network reach) mean that concentrations of leased lines at a specific site are not picked up in our methodology. As noted above, we consider that a degree of approximation is reasonable, and we do not think it appropriate to conduct a detailed overlay analysis of the type Openreach suggests. As noted above and in previous BCMR reviews, we also do not consider that a more localised assessment, possibly by individual premises, of competitive market conditions is practical or proportionate.

7.167 We also note that of the 33 postcode sectors identified by Openreach, our updated analysis places 15 of them into Area 2.

7.168 We acknowledge that some altnets located in Area 3 might offer leased lines. However, our evidence is that the volumes will be small and that the presence of these other networks would not have a material impact on competitive market conditions.[613]

7.169 Accordingly, notwithstanding the presence of some variation, we consider that the conditions of competition in Area 3 are sufficiently similar that no further sub-division is required and we have decided to treat Area 3 as a single market.

Mobile backhaul

7.170 Three said that, based on the rollout plans disclosed in response to its recent tender, BT would face no competing mobile backhaul networks in large parts of Area 2, the CLA or

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[611] Openreach, 2020. Further submission in relation to Area 3 classification for certain locations in leased lines markets.
[612] In the January 2020 Consultation, we noted there were 130 postcode sectors in Area 3 that were BT+1 (i.e. there was some rival leased line network presence) (January 2020 Consultation, Volume 2, paragraph 7.75). Our updated analysis suggests that may have been an underestimate. We now find there to be 457 postcode sectors within Area 3 where our network reach model identifies rival leased line network presence (BT+1 areas). Of these, 216 have no or one demand site. We find that 165 of the 457 are derived from using a new list of postcode sectors, and all have zero or one demand site. Overall, the 457 postcode sectors account for less than 3% of UK demand sites. It remains our view that the presence of rival networks in these postcode sectors does not materially change competitive market conditions such that they should not be included in Area 3.
[613] See paragraph 7.47.

HNR Area. It proposed allocating parts of these areas to an additional geographic market ("Area 2.5"). Three considered that the problem arises because:

- we may be too optimistic in expecting rival mobile backhaul networks in the areas in question;
- our geographic market definition does not consider that multi-service networks may not offer leased lines, and that leased lines networks may not offer mobile backhaul; and/or
- our use of large postcode sectors (and a 50% coverage threshold) make many non-competitive areas appear competitive or potentially competitive. [614]

Our reasoning and decisions

7.171 We do not consider that we have been too optimistic in relation to the potential for network build in the relevant geographic areas. We have only included Virgin Media's and CityFibre's existing and planned networks in our modelling for Areas 2 and 3. Where these networks are available, we would expect them to provide a wide range of services, including mobile backhaul, across the coverage area. In addition, there is potential for further investment by leased line only providers seeking to densify their networks.[615]

7.172 In relation to Three's recent tender, we understand that the contracts awarded to Virgin Media and CityFibre following this tender were for volumes [✂].[616] These contracts will therefore not reflect the capability of rival networks to meet the needs of MNOs by 2026. Also, since the time of this tender, CityFibre has extended its build plans from 5 million to [✂] million premises. Three told us that it expected to be able to [✂].[617] Volume forecasts provided by Three show that it expects [✂].[618] [✂] also provide dark fibre for mobile backhaul connections, which we expect to add to the competitive dynamic.[619]

Modelling assumptions

Geographic units

7.173 In the January 2020 Consultation, we proposed to use postcode sectors as our geographic unit of analysis for LL Access markets.

7.174 [✂] said that we should use a more granular and commercially-based geographic unit and proposed using postcodes, in order to correctly group areas of homogeneous competitive conditions.[620]

7.175 Three said that we should undertake a more precise geographic analysis by assessing competition in more granular units than postcode sectors. Only if a competing network

[614] Three response to January 2020 Consultation paragraphs 5.2 and 5.3, and section 9.
[615] [✂] dated [✂] to s.135 notice date [✂], question 1; [✂] dated [✂] to s.135 notice date [✂], question 1; and [✂] dated [✂] to s.135 notice date [✂], question 1.
[616] Three response dated 12 November 2020 to s.135 notice dated 1 October 2020, question 3.
[617] Three response dated 5 March 2021 to s.135 notice dated 26 February 2021, question 1.
[618] Three response dated 12 November 2020 to s.135 notice dated 1 October 2020, question 2.
[619] [✂] response dated [✂] to s.135 notice dated [✂], questions 4-5; [✂] response dated [✂] to s.135 notice dated [✂], questions 4-5; [✂] response dated [✂]to s.135 notice dated [✂], questions 4-5.
[620] [✂] response to January 2020 consultation, question 7.1.

covers (or has formally approved plans to cover) over 75% of a pixel with mobile backhaul services, should the pixel fall within the 'potentially competitive' area. [621]

7.176 We have used postcode sectors as our geographic unit of analysis for our network reach model in previous BCMRs, having taken into account the possibility that there will be differences in coverage within the postcode sector. Our geographic unit is small enough to capture the local nature of competition, but not so granular as to ignore competitive influences from the surrounding area. Attempting an assessment of competitive market conditions at a very localised level, such as postcodes, would not capture well the potential for nearby network expansion, and (as explained above in relation to our WLA assessment) would not be practical or proportionate. Use of PIA for leased lines has the potential to significantly extend the effective network reach of existing networks, which points to a wider perspective on geographic coverage, not narrower.

7.177 However, we recognise that the timing and extent of take up of PIA is uncertain, and we think that postcode sectors continue to strike the right balance between precision and practicality.

7.178 We have therefore decided to use postcode sectors as the geographic unit of analysis for LL Access markets.

Use of 50m buffer distance

7.179 Our network reach model counts network presence by identifying an operator as 'within reach' if its network is measured to be within a certain 'buffer distance' of a demand site.[622,] We proposed to use a buffer distance of 50m, as we had previously used in BCMR 2019. We said that this buffer distance will capture networks with existing connections or which need very short network extensions.

7.180 CityFibre said that the 50m buffer distance is excessively conservative and resulted in us significantly understating the scale of rival network presence. CityFibre said that based on actual data from its agreed contracts, its average dig distance for new leased line customers is over 50m.[623]

7.181 TalkTalk said that the buffer distance of 50m is unjustifiably high and that the realistic maximum dig distance is in fact less than 15m. TalkTalk said our use of 50m leads to significant errors, as it incorrectly implies that leased line providers who are 49m from a site can constrain Openreach, when in practice they cannot. TalkTalk therefore suggested that we should use a dig distance of 10m.[624]

7.182 Openreach stated that we do not acknowledge that the 50m buffer distance is "relatively short" and that it leads to some anomalies in the markets that are defined.[625]

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[621] Three response to January 2020 Consultation, paragraph 5.6. The MNOs provide us with their coverage data across the UK (for example, for the purposes of our Connected Nations Reports) based on 100m x 100m pixels.
[622] Due to data limitations, we use the geographic centroid of the postcode where the business is located as a proxy for the business' precise location.
[623] CityFibre response to January 2020 Consultation, paragraphs 2.81 to 2.92.
[624] TalkTalk response to January 2020 Consultation, Table 7.3 and paragraph 7.48.
[625] Openreach response to January 2020 Consultation, paragraph 7.53.

7.183 Given our overarching objectives and trade-offs, we believe that using a buffer distance of 50m remains the right judgment. It is the same buffer distance used in the BCMR 2019, and we believe that it is well suited for identifying those areas where there is more substantial competition than in most of the UK, and therefore for defining the HNR Area boundary.

7.184 We do not agree with TalkTalk that a shorter buffer distance should be used. In our view, a 10m buffer distance would not capture well the potential for nearby network expansion. Use of PIA for leased lines has the potential to significantly extend the effective network reach of existing networks, which points to a longer buffer distance, not a shorter one.

7.185 There is a stronger argument for using a longer buffer distance than 50m as suggested by CityFibre. We do not expect this to arise as a result of physical digging over longer distances by leased line focussed operators to connect a specific customer; we have analysed dig distances for connections in the period 2017 – 2019 and find that on average the distances that competing networks have dug has not increased since 2017.[626] However, as noted, PIA offers greater potential for more existing networks to extend their physical reach. In other words, PIA enables network operators to generally densify their network and extend into adjacent areas, bringing them within a short distance of a greater number of demand sites.

7.186 However, we recognise that the timing and extent of take up of PIA is uncertain, and we have therefore decided to use a buffer distance of 50m in this review.

Use of 65% threshold

7.187 When determining whether a given postcode sector is BT+2, we need to decide what proportion (threshold) of demand sites within that postcode sector have two alternative suppliers within 50m. In the January 2020 Consultation, we proposed to use a threshold of 65%.

7.188 CityFibre said that our approach is not appropriate for defining a separate HNR geographic market. Our use of a 65% threshold means 35% of customers may not have the choice of two suppliers in addition to BT. According to CityFibre, this results in competitive market conditions not being sufficiently homogeneous in the HNR Area.[627]

7.189 We recognise that the combination of using postcode sectors and a threshold of less than 100% means that it is possible that some demand sites, within a postcode sector, might be exposed to a lower competitive intensity. However, as discussed above, when defining geographic markets we are required to make a number of judgments and approximations in reaching a decision that sufficiently captures the competitive conditions and is practical. We believe that the use of a 65% threshold in this situation strikes a reasonable balance.

[626] For rival networks to BT, the median dig distance for connections in 2017 - 2019 was approximately 14 metres for each of 2017, 2018 and 2019. This is same distance as we reported in BCMR 2019 (see Table A11.9).
[627] CityFibre response to the January 2020 Consultation, paragraphs 3.166-3.167. We consider the homogeneity of the HNR Area above.

7.190 We used the 65% threshold in the 2019 BCMR. Use of PIA for leased lines has the potential to significantly extend the effective network reach of existing networks, which will reduce the likelihood that some demand sites within an HNR postcode sector lack alternatives.

7.191 We have therefore decided to use a 65% threshold in our analysis.

Updating our network reach model

7.192 Since the January 2020 Consultation we have updated the network reach analysis. In doing this, we used information on network presence as of the end of 2019. We set out the updated results of our network reach analysis below, which we use to define the geographic boundaries of the CLA and HNR Area markets.

Identifying postcode sectors with BT+2 or more networks providing leased lines

7.193 Table 7.5 shows our updated results for postcode sectors where BT+2 or more networks are present. These have been grouped by metropolitan areas.[628]

Table 7.5: BT+2 or more postcode sectors grouped by CLA and metropolitan area

	Postcode sectors		Demand sites 2019[629]		Customer ends connected in 2017 to 2019	
Area	Number	Share of total	Number	Share of total	Number	Share of total
CLA	**278**	**35%**	**4,202**	**32%**	**22,145**	**52%**
Manchester	41	5%	633	5%	1,686	4%
Glasgow	35	4%	875	7%	2,054	5%
Edinburgh	29	4%	731	6%	1,553	4%
Liverpool	24	3%	201	2%	513	1%
Leeds	22	3%	491	4%	1,711	4%
West London	15	2%	349	3%	892	2%
Birmingham	13	2%	425	3%	1,148	3%
Bristol	13	2%	369	3%	1,369	3%
Belfast	9	1%	189	1%	548	1%
South East London	6	1%	177	1%	691	2%
All other HNR areas	318	40%	4,645	35%	8,681	20%
Total for areas of HNR outside CLA	**525**	**65%**	**9,085**	**68%**	**20,848**	**48%**
TOTAL areas of HNR and CLA	**803**	**100%**	**13,287**	**100%**	**42,993**	**100%**

Source: Ofcom network reach and circuit data analysis.

[628] The number of customer ends connected over the period 2017 to 2019 is sometimes larger than the demand sites because firstly, there may be more than one connection to a given demand site (e.g. more than one business in a building), and secondly there may be churn.

[629] Demand sites includes large business sites, mobile cell sites and customer data centres, see Annex 5.

Percentages presented in this table may not add up to exactly 100% due to rounding, Percentage presented as a percentage of HNR Area and the CLA as a whole rather than the entire UK.

7.194 Table 7.6 show results for BT+2 or more postcode sectors and the CLA, grouped by metropolitan areas, in relation to the average number of networks within 50m of demand sites, and the proportion of demand sites with 0, 1, 2, 3, 4 or 5 or more competing networks within 50m.

Table 7.6: CLA and High Network Reach areas grouped by metropolitan area

Area	Average number of competing networks present*	Proportion of demand sites with X competing networks present (cumulative)					
		X = 0 or more	X = 1 or more	X = 2 or more	X = 3 or more	X = 4 or more	X = 5 or more
CLA	**5.1**	**100%**	**99%**	**94%**	**84%**	**71%**	**60%**
Manchester	3.0	100%	96%	83%	57%	35%	18%
Glasgow	2.6	100%	98%	83%	47%	20%	8%
Edinburgh	2.4	100%	96%	79%	47%	11%	3%
Liverpool	2.2	100%	100%	94%	20%	4%	0%
Leeds	2.8	100%	98%	87%	65%	22%	4%
West London	2.7	100%	95%	74%	49%	30%	16%
Birmingham	2.8	100%	97%	84%	62%	26%	7%
Bristol	3.0	100%	96%	86%	69%	26%	15%
Belfast	2.2	100%	99%	92%	31%	0%	0%
South East London	3.0	100%	93%	77%	46%	37%	25%
All other HNR PCS's	2.1	100%	97%	75%	28%	7%	3%
HNR Area (excludes CLA)	**2.4**	**100%**	**97%**	**79%**	**40%**	**14%**	**6%**

Source: Ofcom network reach and circuit data analysis.

** Competing networks to BT include Virgin Media and CityFibre providing leased lines and leased lines-only networks. This is likely to capture networks either connected or very close to demand site (e.g. <20m). Average number of competing networks "present" means the average number of competing networks within 50m of demand sites.*

Definition of the geographic markets for leased lines

CLA

7.195 It is clear that the CLA has greater competition than other parts of the UK.

7.196 Conditions of competition in the CLA are an order of magnitude greater than in the HNR Area (which we consider in the next subsection). Table 7.6 shows that the average number of competing networks 'present' in the CLA is 5.1 as compared to 2.4 in areas of HNR outside the CLA, and consistently higher than that in any other individual metropolitan area. This difference in competitive market conditions is also reflected in the distribution in choice across demand sites. In the CLA, 60% of sites have a choice of five or more networks

within 50m and 84% have three or more. This compares with 6% and 40% respectively in the areas of high network reach outside of the CLA.[630]

7.197 Since the January 2020 Consultation, we have revisited our analysis of the CLA boundary. In particular, we have considered whether there are HNR postcode sectors adjacent to the CLA boundary with competitive market conditions comparable to those within the CLA. We decided that there were not and we have therefore not expanded the CLA boundary.[631] However, in carrying out this analysis, we found there to be three postcode sectors within the CLA boundary that were not included in our CLA market definition in BCMR 2019. We now include these three postcode sectors in the CLA. Two of them were not categorised as being within the CLA in BCMR 2019 and instead as falling within the HNR Area. We have now determined that they are within the CLA. The third is a postcode sector that was not in our BCMR 2019 dataset. We consider that conditions of competition in these three postcode sectors are similar to the rest of the CLA and, as such, they should be included within the CLA market.

7.198 As in previous BCMRs, we recognise that there are some variations within the CLA.[632] As noted above, we accept that there will be some variations in competitive conditions within the geographic markets we define, but we do not consider these variations to be large enough to merit us subdividing the CLA. We explain at paragraph 7.141 why we consider that conditions of competition across the CLA are broadly similar (including in the 12 BT+1 postcode sectors within the CLA boundary). Although competitive conditions in some postcode sectors have changed since 2019 BCMR, we consider that the conditions of competition within the CLA remain similar enough to justify aggregating them into one market.[633]

7.199 In addition, and looking forward, discussions with stakeholders have confirmed the potential for PIA to promote further investment over the review period including in the CLA. It is, however, too early to identify exactly the scale of this network investment, but [✂] have confirmed their intention for build in the CLA.[634] Accordingly, there is ever greater potential for competition to expand into any specific locations within the CLA where there are currently fewer competing networks than the average.

7.200 We therefore consider that conditions of competition continue to be materially different in postcode sectors within the CLA from those elsewhere, and that competitive market conditions within the CLA continue to be sufficiently homogeneous for these to be grouped into a single market.

[630] Annex 5 provides details of other metrics of competition.
[631] See Annex 5 for further details.
[632] The CLA is made up of 278 postcode sectors of which 266 are classified as BT+2 or more. There are also a further 12 postcode sectors that are classified as BT+1.
[633] Further detail on competitive metrics in the CLA can be found in Annex 5.
[634] See Annex 3 for further detail

HNR Area

7.201 While competition is not as strong in areas of HNR as in the CLA, the average number of providers 'present' is 2.4 in areas of HNR, which is materially higher than the average network presence of 0.9 in Area 2.[635] This difference in competitive market conditions is also clear when we compare the distribution in choice across demand sites.[636] In areas of HNR, 6% of demand sites have a choice of 5 or more providers, and 40% have a choice of 3 or more. Our modelling results suggest that in Area 2 less than 1% of demand sites that have a choice of 5 or more providers, and only 2% have a choice of 3 or more.

7.202 In response to the January 2020 Consultation, BT Group said it estimated that there had been a significant increase in competitive network presence in recent years resulting in more competition in areas of HNR and in Area 2.[637] Openreach made similar points.[638]

7.203 As described above, we have updated our network reach analysis. The updated analysis has identified an additional 226 HNR postcode sectors outside of the CLA resulting in 525 postcode sectors in total (these 525 HNR postcode sectors account for about 10% of connections in the period 2017 - 2019).[639] This increase is based on the new information provided by stakeholders to us as to the location of their networks. We found that the average network presence across these additional HNR postcode sectors is 2.2.[640]

7.204 There are 91 postcode sectors that were modelled to be BT+2 in BCMR 2019, but which are no longer BT+2 on the basis of our updated data. Our expectation is that competition in leased lines is growing not receding, so we do not expect any reduction in competition. We also recognise that there is an element of approximation in our modelling and the possibility that some postcode sectors may move from being BT+2 to falling somewhat short as a result of this. Average network presence in these postcode sectors is 1.6, and when extending the buffer distance to 100m, it is 2.7. The average network presence of 1.6 in these postcode sectors is not as high as the average for HNR Area of 2.4, although it is significantly above the average in Area 2 and in Area 3. We also expect network build by Virgin Media, CityFibre and some leased line only networks in HNR areas over this review

[635] Although the approximations used for our network reach metrics become more significant in less densely populated areas with relatively fewer business locations, we consider that the difference between Area 2 and areas of high network reach on this measure is still material. 'Average network presence' is shorthand for the average number of competing networks within 50m of demand sites in a given geographic area.
[636] Annex 5 provides details of other metrics of competition for areas of HNR.
[637] BT Group also said that Ofcom should update its evidence of network presence as late as possible to include any network rollout that takes place in 2020 . See BT Group response to January 2020 Consultation, paragraphs 2.1-2.7. It was not possible, given the lead times involved in obtaining and processing the data, for us to do this.
[638] Openreach response to January 2020 Consultation, paragraphs 2.15-2.36.
[639] 5 postcode sectors that were in our HNR Area at consultation have either moved to the CLA (2) or are not are in our updated postcode sector list (3). Therefore 304 postcode sectors at consultation in the HNR Area minus these 5 postcode sectors, plus 226 new HNR postcode sectors gives the figure of 525.
[640] Just over 70% of these 226 postcode sectors each have an average number of competing networks within 50m of demand sites of 1.5 or more. Of the remaining c.30%, all but one have no demand sites. The average number of competing networks within a postcode sector can be different to the sector classification (i.e. the number of rivals that pass at least 65% of demand sites), because it depends on the proximity of all demand sites in a postcode sector to competing networks. See Annex 5 for further details on our methodology.

period which we would expect to increase network presence. We place value on regulatory stability, and in circumstances where competition is expected to grow substantially, we do not think it would be appropriate to re-classify postcode sectors that we previously found to be more competitive without a compelling reason. Accordingly, we have decided to retain these postcode sectors in defining the HNR Area geographic market.

7.205 Looking forward, we consider that the intensity of competition is likely to increase both in the HNR Area and in Area 2, and we expect the current difference in competitive conditions between these markets to continue to apply during this review period.

7.206 We explained above that competitive conditions in areas of HNR are sufficiently homogeneous to define a single HNR Area market. Competition in areas of HNR is likely to strengthen, facilitated by PIA, but we do not expect this to result in large differences within the HNR Area market, and we have decided that maintaining a single HNR Area over the review period is reasonable.

Area 2 and Area 3

7.207 As explained above, outside the CLA and the HNR Area, we consider the potential for material and sustainable competition in LL Access will arise in areas covered by the CityFibre and Virgin Media networks. As the network footprints of these expansions will be the same for both WLA services and LL Access, we are using the same boundary between Area 2 and Area 3 for LL Access as for WLA services.

7.208 Table 7.7 below shows results for Area 2 and Area 3 in relation to number of postcode sectors, number of demand sites and number of customer ends over the period 2017 to 2019.

7.209 We have determined this boundary between Area 2 and Area 3 by reference to WLA modelling for the reasons set out above. However, we have also considered the results of our network reach model for Area 2 and Area 3 as a sense-check on this market boundary (see Table 7.8).[641]

[641] As noted above, the approximations used for our network reach metrics become more significant in less densely populated areas with relatively fewer business locations. We therefore treat network reach metrics for Areas 2 and 3 with those approximations in mind, but nevertheless consider that they provide a useful sense check on our market boundary.

Table 7.7: Summary of LL Access geographic markets

Area	Postcode sectors		Demand sites in 2019[642]		Customer ends connected in 2017 to 2019	
	Number	**Share of total**	**Number**	**Share of total**	**Number**	**Share of total**
Area 2	5,430	54%	94,565	64%	121,858	60%
Area 3	3,867	38%	40,041	27%	38,909	19%
HNR Area	525	5%	9,085	6%	20,848	10%
CLA	278	3%	4,202	3%	22,145	11%
TOTAL	**10,100**	**100%**	**147,893**	**100%**	**203,761**	**100%**

Source: Ofcom network reach and circuit data analysis.

7.210 Table 7.8 below shows results for Area 2 and Area 3 in relation to the average number of competing networks present and the distribution of customer choice, based on existing network presence.

Table 7.8: Areas 2 and Area 3

Area	Average number of competing networks present	Proportion of demand sites with X competing networks present (cumulative)					
		X = 0 or more	**X = 1 or more**	**X = 2 or more**	**X = 3 or more**	**X = 4 or more**	**X = 5 or more**
Area 2	0.9	100%	76%	13%	2%	1%	0%
Area 3	0.2	100%	17%	2%	0%	0%	0%
HNR Area	2.4	100%	97%	79%	40%	14%	6%
CLA	5.1	100%	99%	94%	84%	71%	60%

Source: Ofcom network reach and circuit data analysis.

7.211 These figures show that there are already significant differences between Area 2 and Area 3, largely reflecting the presence of Virgin Media's existing network. It also confirms the difference between Area 2 and the HNR Area and CLA.

7.212 Taking a forward look, we consider that network expansion by CityFibre and Virgin Media will increase the intensity of competition in Area 2 and could increase the number of postcode sectors with high network presence. Other providers will increase competition in different parts of the UK, though we expect much of this to be in the HNR Area.[643]

7.213 We expect relatively limited market developments in Area 3 over this review period, which will not materially affect the level of competition.

7.214 Overall, we consider that these results confirm a material difference in competitive market conditions between Area 2 and Area 3 in the LL Access market, and that it is right to define these as separate geographic markets.

[642] Includes large business sites, mobile cell sites and customer site data centres – see Annex 5.
[643] In terms of the plans we are aware of, [✂] plan to build to [✂]. [✂] plan to focus on [✂]. [✂] plan to build to [✂]. Finally, [✂] plan to build to [✂].

Conclusion on market definition for LL Access

Application of the three criteria test

7.215 In this subsection, we consider whether the three criteria set out in section 79(2B) of the Act are met in relation to the LL Access markets.

7.216 As set out in Annex 1, in determining whether to identify a market for the purpose of making a market power determination, we must consider whether the three criteria set out in in subsection 79(2B) of the Act are met. Where we do not consider that the three criteria are met, we may not identify a market for this purpose.

7.217 In identifying a market, we may have regard to various recommendations or guidelines published by the European Commission, and guidelines published by BEREC, including the 2020 EC Recommendation. The LL Access market is listed in the 2020 EC Recommendation as a market in which *ex ante* regulation may be warranted.[644]

7.218 Our January 2020 Consultation pre-dated the entry into force of section 79(2B) of the Act. However, we proposed *ex ante* regulation of the LL Access Area 2, LL Access Area 3 and HNR Area markets, as we concurred with the view set out in the (then applicable) 2014 EC Recommendation[645] that the three criteria would be met at a national level in relation to leased lines access.[646] As part of this review, we have assessed whether this continues to be the case for the criteria set out in subsection 79(2B) of the Act.

7.219 As discussed above, we assess the three criteria at general level, taking into account overall characteristics and structure in the relevant product market. We consider competition at a sub-national level in our SMP assessment.

High and non-transitory barriers to entry

7.220 As set out in Section 8, barriers to entry and expansion can exist in the LL Access markets where operators do not have networks in a given area or are not close to demand sites. There are significant economies of scale because once the high fixed cost of investment in network build has been sunk, the marginal cost of connecting an individual premise is relatively low.

7.221 We expect the PIA remedy in the upstream physical infrastructure market to extend the range over which existing networks will be able to compete and substantially reduce the sunk costs of network build, but the extent and timing of this is uncertain. There are also other factors that could present some challenges or create uncertainties for the rollout of rival networks across the UK, and in some part of the UK low density of premises will remain a challenge. We discuss these in Section 8.

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[644] It corresponds to market 2 – wholesale dedicated capacity.
[645] At the time, we were required to take utmost account of the 2014 EC Recommendation.
[646] Subject to considering whether specific competitive conditions might justify the removal of regulation on a sub-national basis (see Explanatory Note to the 2014 EC Recommendation). Leased line access markets were referred to as 'wholesale high-quality access' in the 2014 EC Recommendation.

7.222 Accordingly, high and non-transitory barriers to entry are likely to persist in LL Access markets at a national level. Where barriers are likely to be lower in sub-national markets, we take this into account in our SMP assessment.

A market which does not tend towards effective competition

7.223 We assess competitive conditions in LL Access markets in Section 8 below. In summary, BT generally retains a high service share across all parts of the UK. The evidence we have suggests that there will be substantial investment in networks providing leased lines alongside broadband, plus some build by leased line-only providers, to rival BT during the review period and beyond, particularly in certain parts of the UK. However, the competitive outcome of this investment is uncertain, and the potential for competition is assisted by the existence of continued wholesale regulation. In other parts of the UK, we do not anticipate the emergence of material and sustainable competition to BT.

7.224 Accordingly, we do not consider the market will tend towards effective competition at a national level. We take account of competition at a sub-national level in our SMP assessment.

Insufficiency of competition law

7.225 We set out in Section 8 our competition concerns arising from BT's SMP in LL Access markets. Absent regulation, BT's SMP would give it the incentive and ability to engage in forms of conduct that could distort competition and/or harm consumers. These forms of conduct fall into two broad categories:

- Exclusionary behaviour to prevent potential rival networks from competing in the wholesale access market or gaining market share, which could lead to competitors being excluded from the market, in the long-run leading to poorer outcomes for end-customers.
- Exploitative behaviour by BT at the expense of its wholesale access customers, who compete in the retail market, and therefore ultimately end-users (including higher prices, poorer quality services and less innovation and investment).

7.226 Competition law, in particular the rules prohibiting the abuse of a dominant position, is an important part of the legal framework that BT needs to comply with. Given its position of SMP (which equates to the competition law concept of dominance) BT has a special responsibility not to allow its actions on the market (where conditions of competition are weak) to distort or impair competition.

7.227 However, we consider that competition law remedies would be insufficient to address the identified competition concerns on their own in this context.

- First, competition law would focus on tackling the abuse of a dominant position and would not be as effective as *ex ante* regulation in promoting and protecting competition from rival networks in the LL Access market and in downstream markets.

- Second, regulation must remain effective for the review period, and *ex ante* regulation better enables us to do this as it can be tailored to the particular circumstances in the markets and services provided.
- Third, competition law does not provide enough regulatory certainty, which itself can undermine competition – and regulatory certainty is important in encouraging long-term investment in competing networks. In contrast, a benefit of *ex ante* regulation is that all industry stakeholders are clear in advance on the regulation that will apply.
- Fourth, *ex ante* regulation can facilitate more timely enforcement due to the greater certainty and specificity provided. Although significant fines can be levied for breaches of competition law, which do have some reputational and commercial implications, cases often take considerable time, by which point the damage to competition may be irreversible.

7.228 On that basis, while competition law enforcement may be used in appropriate circumstances, we do not consider that it would be sufficient to rely on it alone in LL Access markets and so consider that *ex ante* regulation is required.

Conclusion on the application of the three criteria test

7.229 We consider that the three-criteria test set out in section 79(2B) of the Act is met in relation to LL Access markets.

Decision on LLA market definition

7.230 We have therefore decided to identify the following markets for LL Access for the purpose of considering whether to make a market power determination:

a) the CLA;

b) the HNR Area: other postcode sectors where there are two or more rival networks to BT in the provision of leased lines; and

c) for the remaining postcode sectors in the rest of the UK (excluding the Hull Area):

i) LLA Area 2: a market comprising postcode sectors in which there is, or there is likely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks;

ii) LLA Area 3: a market comprising postcode sectors in which there is not, and there is unlikely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks.

Assessment of wholesale IEC services

Geographic market definition

Consultation

7.231 In the January 2020 Consultation, we proposed to define each BT exchange as a distinct geographic market.[647]

Stakeholder comments

7.232 Only TalkTalk [648] disagreed with our proposal to define each BT exchange as a distinct geographic market. It argued that geographic markets should be based on the number of rival networks present. As this comment is closely linked to our approach to assessing SMP, we consider it in Section 8. There were a number of other comments on how we should assess the degree of competition in the various markets, which we also address in our assessment of SMP.

Our view

7.233 We have decided to adopt the same approach as set out in our consultation (and in the 2019 BCMR Statement) and to define each BT exchange as a distinct geographic market. We remain of the view that connections to one exchange are not a substitute for connections to another exchange, because providers need to be present at a specific exchange to use access remedies in the corresponding area.[649]

Application of the three criteria test

7.234 In this subsection, we consider whether the three criteria set out in section 79(2B) of the Act is met in relation to the IEC markets.

7.235 As set out in Annex 1, in determining whether to identify a market for the purposes of making a market power determination, we must consider whether the three criteria set out in in subsection 79(2B) of the Act are met. Where we do not consider that the three criteria are met, we may not identify a market for this purpose.

7.236 Our January 2020 Consultation pre-dated the entry into force of section 79(2B) of the Act. However, as we were proposing to define a market that was not listed in the (then applicable) 2014 EC Recommendation, we consulted on the application of the three criteria test (as set out in the EU regulatory framework) to our proposed IEC markets for BT+1 and BT+0[650] exchanges. We proposed that these markets met the three criteria.

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[647] January 2020 Consultation, Volume 2, paragraphs 7.98-7.99. Our approach to SMP leads us to defining which routes are, and are not, competitive based on the rules we apply to each end of the route.
[648] TalkTalk response to January 2020 Consultation, paragraphs 7.57-7.61
[649] As discussed in BCMR 2019, paragraphs 7.74-7.77
[650] Now called BT Only exchanges.

7.237 However, as we had found the markets for CI inter-exchange connectivity at BT+2 exchanges to be effectively competitive in the 2019 BCMR, we did not consider it appropriate to carry out the three criteria test in relation to IEC BT+2 markets.

7.238 Since the January 2020 Consultation, we have identified new exchanges which now meet the BT+2 criteria.[651] We have an obligation to carry out an analysis of these markets to review our earlier market power determination and to consider whether SMP conditions set by reference to that determination should be modified. We therefore include these new BT+2 markets in our assessment of the three criteria test.[652]

7.239 As discussed above, we assess the three criteria at general level, taking into account overall characteristics and structure in the relevant product market. We consider competition at a sub-national level in our SMP assessment.

High and non-transitory barriers to entry

7.240 As set out in Section 8, barriers to entry and expansion can exist in the IEC markets arising from the sunk costs of constructing a significant scale inter-exchange network.

7.241 We recognise that PIA can reduce the cost and time of network build. We also note that inter-exchange connections are likely to be higher value increasing the incentive to connect. However, the impact of PIA in IEC markets over the review period remains uncertain.

7.242 Accordingly, high and non-transitory barriers to entry are likely to persist in IEC markets at a national level. Where barriers are likely to be lower in sub-national markets, we take this into account in our SMP assessment.

A market which does not tend towards effective competition

7.243 We assess competitive conditions in IEC markets in Section 8 below. In summary, in many exchanges BT faces no competition, or only one competitor. Whilst there may be the potential for some build out to some exchanges, depending on the specific location, the extent of such build out is unclear.

7.244 Accordingly, we do not consider the IEC markets will tend towards effective competition at a national level. We take account of competition at a sub-national level in our SMP assessment.

Insufficiency of competition law

7.245 Our main concerns in relation to IEC markets are as follows:

a) the importance of IEC services at these exchanges to the state of competition in WLA and LL Access;

[651] The results of our analysis can be found in Annex 6.
[652] We remain of the view that it is not appropriate to apply the three criteria to those BT+2 exchanges that have already been deregulated.

b) the risk of excessive pricing of IEC services which could result in high prices for end-users; and

c) that it is unlikely that competitors will build to many of these sites.

7.246 We do not consider *ex post* competition law would be sufficient to address these concerns, for the following reasons:

a) Given that it is unlikely that competitors will build to many of these exchanges, we consider some form of *ex ante* network access obligation is required to ensure effective competition;

b) the need for timely and efficient intervention to avoid adverse effects on those providing services in the IEC and LL Access markets as well as the end-users of leased lines;

c) if BT engaged in the behaviour mentioned above, there could be long-term or irreversible damage to competition in the markets;

d) *ex ante* regulation provides clarity and certainty to BT and to other providers of leased lines; and

e) the response to anti-competitive behaviour may not be sufficient to prevent harm in certain circumstances.

7.247 For these reasons, we consider that competition law would not be sufficient by itself to address concerns in IEC markets at a national level and therefore *ex ante* regulation is necessary to maintain effective competition.

Conclusion of application of the three criteria test

7.248 For the reasons above, we consider that the markets for IEC services meet the three criteria test.

Decision on market definition for IEC services

7.249 We have therefore decided to identify each new BT+2 exchange[653], and each BT+1 and BT Only exchange as a distinct market for the purposes of making a market power determination.

[653] New BT+2 exchanges (i.e. those not already deregulated) are indicated in Schedule 4 to the legal conditions in Volume 7. For ease of reference, we also include in Schedule 4 a list of BT+2 exchanges that were already deregulated, although we do not define these as markets or include them in our SMP assessment.

8. Wholesale networks – SMP analysis

8.1 This section presents our significant market power (SMP) assessment for the relevant product and geographic markets defined in Sections 6 and 7. Specifically, we examine whether any provider has SMP in the provision of wholesale local access (WLA), leased lines access (LL Access), or inter-exchange connectivity (IEC) in the geographic markets identified in Section 7.

8.2 As set out in Section 7, we have concluded that the three criteria set out in section 79(2B) of the Act is met in each of the markets we have identified for WLA, LL Access and IEC services. We have therefore undertaken an SMP assessment in these markets.[654]

8.3 We have concluded that BT has SMP in each of the following markets that we identified:

- WLA: Area 2 and Area 3;[655]
- LL Access: Area 2, Area 3 and HNR Area; and
- IEC: BT Only and BT + 1 exchanges.

8.4 We have concluded that BT does not have SMP in each of the following markets that we identified:

- LL Access: CLA; and
- IEC: new BT+2 markets.

8.5 We set out our analysis and findings in the following order:

- Approach to SMP assessment;
- Stakeholder responses to our proposed WLA SMP findings;
- SMP assessment for the WLA markets (Area 2 and Area 3);
- Stakeholder responses to our proposed LL Access SMP findings;
- SMP assessment for the LL Access markets (Area 2, Area 3, HNR Area and CLA);
- Stakeholder responses to our proposed IEC SMP findings; and
- SMP assessment for the IEC markets (BT Only, BT+1 and BT+2 exchanges).

8.6 Finally, we discuss our competition concerns in each of the WLA, LL Access and IEC markets.

Approach to SMP assessment

8.7 SMP is defined in the Act as meaning a position which amounts to or is equivalent to dominance of the market;[656] that is, a position of economic strength affording a telecoms

[654] As noted in Section 7, we only formally define new BT+2 exchanges as markets (i.e. those not already de-regulated). We therefore only carry out an SMP assessment in relation to these exchanges.
[655] As discussed in Section 7, we have not identified an 'Area 1' market in the provision of WLA services at this time for the purpose of considering whether to make a market power determination.
[656] Section 78 of the Act. Dominance of a market in this context is to be construed, so far as appropriate, in the same way as the reference to a dominant position in a market in section 18 of the Competition Act 1998.

provider the power to behave to an appreciable extent independently of competitors, customers and ultimately consumers.[657]

8.8 In this subsection we set out our approach to the SMP assessment.

Our assessment is forward-looking

8.9 As outlined below, we conduct an SMP assessment to see whether *ex ante* regulation is necessary over the timeframe of this review. We conduct a forward-looking assessment of the market, taking into account expected or foreseeable developments that may affect competition in the market.[658]

8.10 As set out in Volume 1, this market review covers the period April 2021 to March 2026. Our approach to supporting investment in networks is focused on encouraging competition between different networks where viable, which will provide high quality services, choice and affordable broadband for consumers throughout the UK.

We adopt a modified greenfield approach

8.11 Similar to our market definition analysis, we apply the modified greenfield approach, as discussed in Annex 1. The SMP assessment assumes that there is no *ex ante* regulation arising from a finding of SMP within the relevant market in question, but *ex ante* SMP remedies in other markets continue to apply.

8.12 For example, we therefore assume that PIA remedies imposed in the upstream market for the supply of wholesale access to physical infrastructure apply, and therefore BT is required to provide unrestricted access to its ducts and poles everywhere in the UK (excluding the Hull Area).

8.13 A further implication of this is that we consider competitive conditions in the absence of SMP regulation in the market we are analysing. Some market features may differ from the conditions we observe with regulation in place. For example, existing SMP regulation may prevent conduct by BT which would otherwise increase barriers to entry, weaken the competitive position of competing network operators or limit the potential for countervailing buyer power.

We assess SMP using a range of criteria

8.14 We set out the criteria that we consider to be relevant to our assessment of SMP in the wholesale markets. We consider these criteria to be relevant as they reflect our understanding of the factors driving competitive conditions in the markets we are reviewing. These criteria are used by UK competition authorities in assessing market power and dominance, and we have also had regard to the criteria set out in the EC SMP

[657] See Office of Fair Trading, 2004. *Assessment of Market Power* (OFT 415) (subsequently adopted by the CMA Board), paragraphs 2.8 – 2.10; *United Brands* [1978] ECR 207.
[658] This is in line with section 79 of the Act.

Guidelines. We set out our view on each of these criteria in the relevant assessment for each wholesale market.

Market shares provide an indication of competitive conditions

8.15 Market shares provide a useful first indication of competitive conditions in the market as the greater the number of competing networks that have managed to attain a material share of supply, the stronger is the indication that the intensity of competition is greater.

Competition from existing infrastructure and barriers to entry and expansion are important factors in our assessment

8.16 BT has by far the largest and the only nationwide network in the UK, which is not easily duplicated due to the high sunk costs involved. Therefore, in large parts of the UK, BT will have network presence while other operators will not. This gives BT a significant competitive advantage in these areas as BT will be able to service customers quickly and at a significantly lower cost.[659]

8.17 Against this backdrop, our SMP assessment looks at:

- presence of competing network infrastructure; and
- potential competition based on network expansions, facilitated by PIA.

8.18 We consider that the most important factor affecting the strength of competition in an area is the coverage of competing network infrastructure. A greater number of competing networks present is likely to lead to a greater competitive constraint on BT. Three agreed with this, noting that "the key factor determining the degree of competition in an area is the number of suppliers with network presence."[660]

8.19 Where operators are not present in an area, and there are barriers to entry and expansion, this makes it more difficult for competing networks to compete with BT. TalkTalk[661] and Three[662] agreed with this. The main barrier to entry is the high sunk cost and time it takes to roll out networks (discussed below). Other barriers[663] may include economies of scale and scope[664] as even where BT needs to extend its network it may have a lower unit cost in areas where it can recover common costs from a much larger customer base compared to other operators.

8.20 Vodafone argued that our view of coverage as the most important factor driving competition was an oversimplification of competitive conditions as there are numerous hurdles before a provider can act as a competitive constraint including, for example,

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[659] We indicate the potential scale of this advantage when competing for the different wholesale markets in Annex 3.
[660] Three response to January 2020 Consultation, page 12.
[661] TalkTalk response to January 2020 Consultation, paragraph 4.109.
[662] Three response to January 2020 Consultation, page 5.
[663] BT may have other competitive advantages arising from customer switching costs and national coverage which may hinder the ability of rivals to compete for existing customers.
[664] Economies of scale occur where the unit cost falls as volumes of the same service increase, and economies of scope where the unit cost falls as volumes of different services increase.

buyers' reluctance to purchase from multiple suppliers in order to minimise costs.[665] As outlined below, we have taken account of these additional factors in, for example, our assessment of barriers to entry and countervailing buyer power.

8.21 We expect that PIA has the potential to reduce barriers to entry and increase the likelihood that network operators will expand their network footprint and therefore constrain BT's market power in certain areas:

a) PIA will have a significant impact on reducing the time and cost involved in network expansion.[666]

b) PIA is likely to reduce BT's advantages from economies of scale and scope in some areas as it enables more fibre investment by competing networks.

c) However, the extent and timing of this is uncertain.

We assess whether customers could have countervailing buyer power

8.22 We consider that a customer would have a degree of buyer power where they have a credible outside option – in this case a choice of networks or self-supply – and if the volumes for which they have a credible outside option are material. Both of these requirements need to be met.

Evidence on pricing informs our assessment

8.23 In a competitive market, individual firms would not be able to raise prices above costs and earn returns above the cost of capital for a sustained period. The ability to price at a level that keeps profits persistently and significantly above the competitive level is one indicator of market power. In regulated markets, pricing up to the cap indicates that other constraints are insufficiently strong to hold prices below the level of the cap.

8.24 CityFibre argued that although analysis of absolute pricing levels can play a role in assessing market power, it has limitations as pricing to the cap could also be a necessary commercial practice for supporting fibre investment:[667]

a) due regard should be given to allowing sufficient headroom for fibre investment; and

b) the fair bet must be taken account of in any profitability analysis.

8.25 We agree that higher prices may be necessary to support fibre investment and have considered the drivers of BT's pricing practices, and the extent to which pricing is motivated by factors other than competition, as part of our SMP assessment.

[665] Vodafone response to January 2020 Consultation, Part 2, page 57.
[666] See Annex 3.
[667] CityFibre response to January 2020 Consultation, page 63.

8.26 In the context of the CLA, TalkTalk argued that the level of prices is only indirectly relevant to SMP because: [668]

a) it is the margin that is relevant, rather than the level of prices;

b) price reductions may be due to cost differences, rather than the impact of competition; and

c) we should compare Openreach's pricing to that of its competitors.

8.27 In the context of LL Access, Vodafone also argued that we should identify the range of prices that are on offer from both Openreach and its rivals.[669]

8.28 CityFibre,[670] TalkTalk[671] and Vodafone[672] also argued that profitability analysis could play a useful role in our assessment of market power.

8.29 We have gathered data from Openreach on the average discounted price of its charge-controlled services and considered documentary evidence on the drivers of discount schemes.

8.30 We have not generally considered profitability as a main part of our assessment of SMP. Profitability analysis is not particularly informative for our purposes as changes may be explained by a number of factors including investment or changes in competitive conditions. Our review is also forward-looking, and profitability analysis will be driven by historical competitive conditions. We do consider returns where relevant in the context of pricing.

We have considered other criteria

8.31 We also consider external constraints. In principle, products which are outside a market can still exert some constraining effect on the prices of products within it. We consider the extent to which fixed wireless access (FWA) and mobile broadband are likely to be a constraint on BT's market power in WLA below. For LL Access, we have not identified any products outside of the product market which could act as an external constraint.

Our assessment of SMP applies to BT as a whole

8.32 As explained in Annex 1, we are required to determine a "person" to have SMP, but we consider it appropriate to prevent BT from using another group company to avoid compliance with SMP conditions. We therefore apply SMP conditions to a group of companies, e.g. BT plc and any of its subsidiary, holding or sister companies (as more specifically defined in the legal conditions at Volume 7).

[668] TalkTalk response to January 2020 Consultation, page 138.
[669] Vodafone response to January 2020 Consultation, Part 2, paragraphs 5.49-5.52.
[670] CityFibre response to January 2020 Consultation, paragraph 4.51.
[671] TalkTalk response to January 2020 Consultation, page 139.
[672] Vodafone response to January 2020 Consultation, Part 2, paragraphs 5.24-5.25.

8.33 [✂][673] [✂].

8.34 [✂].

Stakeholder responses to our proposed WLA SMP findings

8.35 In the January 2020 Consultation, we proposed to find that BT has SMP in WLA in Areas 2 and 3. We did not propose to define a market for 'Area 1' postcode sectors, and therefore did not conduct an assessment of market power.

8.36 The majority of stakeholders either did not comment or agreed (ACNI,[674] Cumbria County Council,[675] BUUK,[676] CityFibre,[677] FCS,[678] Gigaclear,[679] KCOM,[680] TalkTalk[681]) with our WLA proposed market power findings.

8.37 TalkTalk suggested we should reassess our market power findings in line with a revised geographic market definition.[682] TalkTalk argued that we should have used a higher network coverage threshold than 50% in our geographic market definition, on the basis that 50% is too low for operators to act as an effective competitive constraint on Openreach. However, TalkTalk noted that this would still result in an insufficient competitive constraint on Openreach in the majority of Area 2. We disagree with TalkTalk's proposal to raise the coverage threshold, for the reasons outlined in Section 7 and note that increasing the threshold would not change our SMP findings.

8.38 BT Group[683] and Openreach[684] disagreed with our proposed WLA SMP findings for Areas 2 and 3 arguing:

- that we have largely overlooked or dismissed the emergence of a contestable WLA market enabled by significant reductions in barriers to entry or expansion;
- that we have not taken proper account of important developments including telecoms provider-led tenders and long-term agreements,[685] the presence of Virgin Media's extensive and established ultrafast network (and its consolidation, expansion and wholesaling intentions),[686] new network entry, the lack of any significant advantage for Openreach and evidence of intensifying competition; and
- that Openreach does not have a competitive advantage in the move to ultrafast.

8.39 We address stakeholders' more detailed comments on our analysis and evidence below.

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673 [✂]
674 ACNI response to January 2020 Consultation, page 1.
675 Cumbria County Council response to January 2020 Consultation, question 8.1.
676 BUUK response to January 2020 Consultation, question 8.1
677 CityFibre response to January 2020 Consultation, paragraphs 4.1, 4.36-4.48.
678 FCS response to January 2020 Consultation, page 1
679 Gigaclear response to January 2020 Consultation, paragraphs 66-72.
680 KCOM response to January 2020 Consultation, paragraph 2.10.
681 TalkTalk response to January 2020 Consultation, page 11 and paragraph 4.155.
682 TalkTalk response to January 2020 Consultation, Section 4.2.3.
683 BT Group response to January 2020 Consultation, paragraphs 2.3-2.4 and 2.8.
684 Openreach response to January 2020 Consultation, paragraphs 1.6, 1.23, 2.1, 2.52-2.54.
685 BT Group response to January 2020 Consultation, paragraphs 2.10-2.12, 2.50-5.1.
686 BT Group response to January 2020 Consultation, paragraph 2.52.

WLA SMP analysis and evidence

8.40 In this subsection we set out our analysis and evidence underlying our SMP assessment across WLA markets. In the next subsection we set out our assessment and SMP findings for each geographic market, drawing on this general analysis and evidence.

Market shares

8.41 We present BT's market share in the supply of WLA in Areas 2 and 3, showing BT has a high share of both markets.

8.42 We have estimated market shares in Areas 2 and 3 based on shares of June 2020 active broadband connections. Our analysis is based on data collected from network operators and the same underlying dataset discussed in Section 7. We set out more detail on our approach to this analysis in Annex 4.

8.43 Market share calculations are based on the number of active copper, fibre and cable broadband connections, and do not include customers that take a standalone landline service.[687] This tends to understate BT's position. While the number of standalone landline customers is declining, and volumes are low, BT accounts for over 75% of these customers.[688] In addition, other retail providers also use Openreach wholesale products to provide a standalone landline service. If standalone landline connections were included in our estimate of wholesale market shares, we therefore expect that BT's share would increase.

Competition from existing network infrastructure

8.44 BT's coverage gives it an advantage over other operators in the provision of WLA services as in a large part of the UK there are no competing networks. Sky, for example, noted that "BT will continue to be a key supplier for large parts of the country".[689]

8.45 We assess below the extent to which competing networks have coverage (in terms of premises passed) in each of our geographic markets. Where competing networks have existing infrastructure, they are more able to provide a degree of competition to BT for customers in that area.

8.46 We note that BT's coverage and nationwide network also gives it a competitive advantage because ISPs are, and will continue to be, reliant on BT to deliver services to many of their customers, and there are costs to buying from multiple networks. [✂][690] and Gigaclear[691] noted the advantage this coverage and existing relationships with ISPs give Openreach in

[687] Standalone landline refers to a landline service bought as a standalone contract and not as part of a bundle with other services such as broadband or Pay TV.
[688] Ofcom, 2020. Consultation: Protecting voice-only landline telephone customers, paragraph 3.4.
[689] Sky response to January 2020 Consultation, page 12.
[690] [✂] response to January 2020 Consultation, [✂].
[691] Gigaclear response to January 2020 Consultation, paragraph 69.

competing for market share. TalkTalk[692] also agreed that in the roll-out of FTTP networks, BT could rely on having downstream BT as an anchor customer.

8.47 We also assess below the extent to which competing networks exert an indirect constraint on Openreach's behaviour via their presence on the retail market.

Barriers to entry and expansion

Barriers to entry and expansion are a feature of WLA markets

8.48 Barriers to entry and expansion can exist in the WLA markets arising from the cost of constructing a significant scale local access network and from the existence of high sunk costs. Networks that support WLA services are most efficiently built by initially 'passing' large blocks of premises (e.g. all of the houses on a particular set of streets), and then using that network to connect new customers. A considerable proportion of the costs of the investment are then sunk because, once built, many components of the network either have low resale value or, where they involve recovery of assets, significant costs would be incurred in order to extract and resell them.

8.49 This creates a large economy of scale because once the high fixed cost of investment in network build has been sunk, the marginal cost of connecting an individual premises is relatively low.[693] In addition, there may also be regional economies of scale arising from the fixed cost of maintaining operations in a particular area, or local marketing.

8.50 In response to the January 2020 Consultation, BT Group argued that PIA removes Openreach's cost, coverage and speed of provision advantage.[694] As outlined in Annex 3, the evidence we have suggests that there will be substantial investment in fibre and gigabit-capable network build to rival BT during the review period and beyond, and PIA is a significant factor in many network investment plans. Under the modified greenfield approach, we take into account PIA in this SMP assessment as it is imposed upstream of WLA.

8.51 However, while we expect PIA to substantially reduce the sunk costs of network build and competition to grow substantially in this review period, the extent and timing of this is uncertain. There are other factors that could present some challenges or create uncertainties for the roll-out of competing networks. We discuss these below.

Roll-out of competing networks will take time and requires a minimum level of take-up

8.52 Investment in the roll-out of competing networks is likely to take several years to complete. The roll-out period can be affected by the need for wayleaves, availability of resources (including workforce) and the need for street works. CityFibre and TalkTalk[695]

[692] TalkTalk response to January 2020 Consultation, paragraph 3.7.
[693] Being able to realise economies of scope, in particular by using the network to sell leased lines, can also significantly improve the viability of the entry case.
[694] BT Group response to January 2020 Consultation, paragraphs 1.12 and 2.25.
[695] TalkTalk response to January 2020 Consultation, para 4.110.

agreed with this. For example, CityFibre noted that building a comprehensive network in an average city is likely to take at least 3 years, and its deployment in Milton Keynes [✂].[696] This means competing networks will take time to become sufficiently well established to address BT's competitive advantage.

8.53 New network entrants need to establish a minimum level of take-up to break even. We gathered information from network providers on this required take-up.[697] Based on these responses, we understand that break-even take-up is a material share of premises, but that this can vary between projects depending on cost. This customer take-up would need to be built by attracting retail customers to switch from other networks and/or by attracting wholesale customers such as Sky, Talk Talk or Vodafone.

8.54 Achieving this take-up can take time. For example:

- [✂] estimate it takes [✂] years in the market to reach around [✂]% retail take-up.[698]
- [✂] achieved a retail take-up of [✂]% in [✂] after [✂] years and forecast a take-up of [✂]% in their long-run business plan after two years [✂].[699]
- A range of other networks [✂] provided similar information on take-up over time consistent with this.[700]

8.55 In contrast, Openreach benefits from having downstream BT (including Plusnet and EE) as an anchor customer and having a large installed base across other ISPs. As set out in Section 2, BT has the largest retail market share (34%) while Openreach also supplies wholesale services to other large retail providers such as Sky and TalkTalk (23% and 11% retail market share respectively).

Wholesale deals can support entry, but do not remove all impediments

8.56 One potential avenue for new entrant network operators to reach scale and gain the necessary take up is through wholesale deals with larger ISPs. Given that these potential wholesale customers currently have large subscriber bases, existing customer relationships and recognised brands, such deals could enable entrants to grow customer take-up quickly and reduce risks. A number of stakeholders agreed with this (including Sky,[701] BT Group,[702]

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[696] CityFibre response to January 2020 Consultation, paragraph 4.56.
[697] Community Fibre response dated 10 September 2020 to s.135 notice dated 20 August 2020, question 4; County Broadband response dated 25 September 2020 to s.135 notice dated 4 September 2020, question 4; Jurassic Fibre response dated 29 September 2020 to s.135 notice dated 18 August 2020, question 4; Swish Fibre response dated 28 September 2020 to s.135 notice dated 17 August 2020, question 4; Truespeed response dated 30 September 2020 to s.135 notice dated 19 August 2020, question 4; Virgin Media response dated 8 September 2020 to s.135 notice dated 22 July 2020, question 2; TalkTalk response to January 2020 Consultation, paragraph 3.6; [✂] response dated [✂] to the s.135 dated [✂], question 6.
[698] [✂] response dated [✂] to s.135 notice dated [✂], question 2.
[699] [✂] response dated [✂] to the s.135 dated [✂], question 3.
[700] [✂] response dated [✂] to s.135 notice dated [✂], question 4; [✂] response dated [✂] to s.135 notice dated [✂], question 4; [✂] response dated [✂] to s.135 notice dated [✂], question 4; [✂] response dated [✂] to s.135 notice dated [✂], question 4; [✂] response dated [✂] to s.135 notice dated [✂], question 4; [✂] response dated [✂] to s.135 notice dated [✂], question 4; [✂] response dated [✂] to s.135 notice dated [✂], question 4.
[701] Sky response to January 2020 Consultation, page 8.
[702] BT Group response to 2020 January 2020, paragraph 2.10.

TalkTalk[703] and Three[704]). BT Group notes, for example, that "attracting large customers such as Sky, TalkTalk, and Vodafone through competitive access pricing and long-term deals allows risks to be mitigated".[705] However, the potential for these arrangements does not remove all entry impediments, which we discuss in turn below:

a) In the absence of SMP regulation of the WLA markets, anti-competitive behaviour by BT could disincentivise ISPs from switching some of their business to new entrant network operators.

b) Securing deals with large wholesale customers can assist new entry, but there are challenges and uncertainties.

c) Switching costs mean that migration of end-customers is likely to be more difficult once they are connected to an FTTP network. This is because migration will lead to financial costs, and disruption to the end-customer.

Anti-competitive behaviour by BT could deter new network build

8.57 Under the modified greenfield approach, we assess SMP in the absence of regulation in the WLA market. This means our assessment includes conduct that could take place if BT faced no regulation in WLA. BT could have the incentive, and in the absence of regulation the ability, to foreclose the entry or expansion of competing network operators, to limit this potential competitive threat. This could result from actions including offering geographic discounts to wholesale prices in areas where it faces potential competition from competing networks, other commercial terms including certain kinds of volume discounts or targeted overbuild. This could disincentivise ISPs from switching and make it more difficult for alternative network providers to achieve scale.

8.58 Over the period of the review, ISPs will remain reliant on Openreach across a substantial part of the UK. As discussed in Volume 3, Section 7, we are concerned that Openreach could design commercial terms which undermine alternative network rollout. For example, commercial arrangements such as loyalty discounts or pricing contingent on large volume commitments from wholesale customers, which penalise access seekers for moving volumes from Openreach to an alternative network operator. BT's internal documents outline its intention to [✂][706] and more recently to [✂].[707] Competing network operators (including Axione,[708] CityFibre,[709] and Jurassic Fibre[710]) and INCA[711] have also expressed concerns over the risk of strategic behaviour by Openreach frustrating plans.

[703] TalkTalk response to January 2020 Consultation response, paragraph 3.6.
[704] Three response to January 2020 Consultation, paragraph 2.12.
[705] BT Group response to January 2020 Consultation, paragraph 2.10.
[706] Openreach response dated 12 August 2019 to the s.135 dated 29 July 2019, [✂].
[707] Openreach response dated 25 September 2020 to the s.135 dated 20 August 2020, [✂].
[708] Axione response to January 2020 Consultation, section 5.5.
[709] CityFibre response to January 2020 Consultation, section 7.
[710] Jurassic Fibre response to January 2020 Consultation, paragraph 24.
[711] INCA response to January 2020 Consultation, paragraph 5.4.2.

8.59 The emergence of potential competition from new entry and expansion may therefore be dependent on SMP regulation of the WLA market to prevent such behaviour. We discuss this issue further in the context of remedies in Volume 3, Section 7.

Securing commitments from wholesale customers

8.60 Commitments by wholesale customers to long term volume take-up can significantly reduce the risks for entrants. BT Group also said that wholesale demand is more likely to be driven by ISPs seeking long-term agreements that will support them in establishing retail positions in the provision of ultrafast-capable lines and network operators seeking deals to support their costly and risky investments in ultrafast networks.[712] Openreach also says that, even if Ofcom concluded that end-customers have limited demand and willingness to pay no more than a modest premium for ultrafast speed connections today and over the course of this review, there is clear evidence that ISPs see commercial benefits to purchasing ultrafast-capable connections where these are available. Furthermore, the pressure on new networks to secure long-term deals with ISPs to support their investment is an opportunity to secure attractive prices even if end customers do not have clear demand for the higher speeds that can be supported by those networks.[713]

8.61 We note that some ISPs have entered volume or revenue commitments (for example, [✂][714]). The ability to offer ultrafast capable connections may be a factor in such deals.

8.62 However, achieving such commitments is dependent on ISPs being willing to engage with entrants, and there are factors that suggest it may be challenging for new entrants to secure this engagement, particularly for smaller networks. Some network providers may have business models that are not dependent on attracting large customer bases, such as those that are very targeted (e.g. target MDUs). However, this targeted nature limits the nature of constraints from these networks.

8.63 ISPs reliant on Openreach in some areas and using competing networks in others would need to multi-source, which carries additional costs. In response to our January 2020 Consultation, BT Group argued that we had not shown that dual-sourcing is commercially unattractive.[715] We agree that dual-sourcing is viable. However, there is a cost to buying from multiple networks. For example, TalkTalk noted fixed/sunk costs of systems integration and complexity costs, including differences in speed variants and contention ratios [✂].[716] Therefore, an effective competitor needs to have significant scale, or to be able to offer some other advantage which offsets the cost.

8.64 We have gathered documentary evidence from providers which supports this. [✂].[717] In particular, [✂].[718] [719] However, competing networks can also be attractive to ISPs if they

[712] BT Group response to January 2020 Consultation, paragraph 2.41.
[713] Openreach response to January 2020 Consultation, paragraphs 2.37 – 2.51.
[714] [✂] response to October 2020 Consultation, paragraphs [✂].
[715] BT Group response to January 2020 Consultation, paragraphs 2.23, 2.29-2.30.
[716] TalkTalk response to January 2020 Consultation, paragraph 4.316.
[717] [✂] response dated [✂] to the s.135 notice dated [✂], question 5.
[718] [✂] response dated [✂] to s.135 notice dated [✂], questions 1-2.
[719] [✂] response dated [✂] to the s.135 notice dated [✂], question 5.

offer other advantages such as coverage which is complementary to that of other networks. [✂].[720] [✂].[721] [✂].[722]

8.65 Similarly, TalkTalk and Vodafone currently have wholesale agreements with CityFibre.[723] [✂],[724] and [✂].[725]

8.66 We note that some competing networks have been in discussions to create a common wholesale platform that could create scale by giving access to a combination of several networks.[726] However, the likelihood and impact of this platform being created is uncertain. County Broadband also noted[727] that it had struggled to attract interest from retail ISPs and that even with the creation of a common wholesale platform across competing networks it was concerned that ISPs would prefer only to use the Openreach network if available. Other stakeholders noted that the costs of buying from multiple networks "[✂]"[728] and that "retail ISPs have historically been reluctant to engage with individual competing networks for wholesale access".[729]

8.67 BT Group and Openreach both argued that ISP-led tenders and long-term agreements for WLA can create very competitive conditions.[730] In particular, BT Group argued that this arises because networks cannot be sure who else is bidding, or how close to incremental cost they are bidding. We note that [✂][731] issued a tender inviting ultrafast networks to bid for their business.

8.68 We recognise that the potential constraint arising from tenders is likely to be stronger in areas where BT faces greater competition from CityFibre and Virgin Media. However, wholesale customers will remain dependent on continued wholesale access to BT's network while the new competing networks are built and in areas where competing networks do not plan to provide coverage. Also, as discussed above, the existence of our *ex ante* regulation in WLA markets in the interim is necessary, for example to prevent Openreach designing commercial terms which could undermine competing network operator roll-out and make it more difficult for them to compete in tenders. Wholesale customers are also incentivised to issue tenders in order to seek more favourable terms from BT. The stated approach of [✂].[732]

8.69 We also note that compared to its rivals, [✂].[733]

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[720] [✂] response dated [✂] to the s.135 notice dated [✂], question 5.
[721] [✂] response dated [✂] to the s.135 notice dated [✂], question 5.
[722] [✂] response dated [✂] to the s.135 notice dated [✂], question 5.
[723] CityFibre, 2020. *CityFibre acquires FibreNation and adds TalkTalk as strategic customer* [accessed 3 March 2021].
[724] [✂] response dated [✂] to the s.135 notice dated [✂], question 5.
[725] [✂] response dated [✂] to the s.135 notice dated [✂], question 6.
[726] INCA response to January 2020 Consultation, paragraph 19.
[727] County Broadband response to January 2020 Consultation, paragraphs 32-39.
[728] [✂] response to January 2020 Consultation, paragraph [✂].
[729] INCA response to January 2020 Consultation, paragraph 19.
[730] BT Group paragraph 2.11; and Openreach, paragraph 2.47, in their responses to January 2020 Consultation.
[731] [✂] response dated [✂] to the s.135 notice dated [✂], question 3.
[732] [✂] response dated [✂] to the s.135 notice dated [✂], question 3.
[733] [✂] response dated [✂] to the s.135 notice dated [✂], question 3.

8.70 Wholesale access deals do not in themselves give direct access to the retail part of the value chain.

8.71 Accordingly, while wholesale supply deals can significantly de-risk new entry, uncertainties remain as to how quickly and to what extent this will encourage new entry.

Switching costs mean the potential for entry is greatest in the transition to FTTP

8.72 One challenge for new entrants is the time it takes to achieve customer switching. The migration to FTTP will lead to financial costs (such as the cost of connecting the customer to the network), and disruption to the end customer.[734] It is likely to be more difficult for ISPs to convince customers the disruption of switching is justified when customer satisfaction is high and switching would not result in access to services not already available.

8.73 This means that the potential for wholesale deals to support entry may be greater where most customers have not yet migrated onto an FTTP network. The opportunities provided by this migration process will eventually close, creating a time window where entry is more likely to occur.

8.74 We discuss prospects for entry or expansion by competing networks in each geographic market below.

Key evidence on existing infrastructure and potential competition from network build

8.75 In Table 8.1 below we present the key evidence for the WLA markets; namely market shares, competition from existing infrastructure presence and potential competition from network build.

Table 8.1: Key evidence for WLA markets

	Area 2	Area 3
BT, share of WLA connections[735]	[✂] 61-80%	[✂] 91-100%
Next largest rival (Virgin Media), share of connections	[✂] 21-40%	[✂] 0-10%
Total premises	21.7m	9.2m
BT's largest rival (Virgin Media), % of premises passed	[✂] 61-70%	[✂] 0-10%

Source: Ofcom analysis of provider data.

[734] TalkTalk response to January 2020 Consultation, paragraphs 3.6- 3.7, 4.18 and 4.20, 4.129; CityFibre response to January 2020 Consultation, paragraph 4.40-4.42.
[735] Includes active broadband connections only i.e. exclude standalone landline connections.

Countervailing buyer power

8.76 Whether a wholesale customer has countervailing buyer power will rely on a number of factors including: whether competing network operators have sufficient coverage to provide a credible alternative to BT, the time taken and cost involved for new networks to be built, the degree of commitment/risk required from the buyer and the cost and speed of switching to alternative wholesale providers.

8.77 A number of ISPs have large customer bases which, if switched to a competing network operator, would generate economies of scale. In response to the January 2020 Consultation, BT Group commented that ISPs like Sky have leverage in negotiations because they have strong brands and large customer bases that can be upsold full fibre services.[736] CityFibre[737] and TalkTalk[738] disagreed that there was significant scope for countervailing buyer power. TalkTalk noted that Virgin Media or BT retail customers cannot be leveraged against Openreach.

8.78 We expect substantial investment in network build during the review period and beyond, facilitated by PIA. Though we do not yet have evidence on how effective this will be in practice, if entry is successful this could increase the scope for countervailing buyer power in future.

8.79 We have discussed above the potential for ISPs to reduce barriers to entry for competing networks. In this subsection, we focus on the extent to which the potential for competition, including wholesaling by existing established networks, has an impact on outcomes for ISPs in negotiations with Openreach.

Potential for Virgin Media to provide wholesale services

8.80 In the January 2020 Consultation, we noted recent speculation that Virgin Media was considering providing wholesale access services (either on its own, or via a joint venture with Sky).[739] This would compete directly with BT in wholesaling and could provide ISPs with a further option and potentially greater countervailing buyer power.

8.81 In response to the January 2020 Consultation, BT Group argued[740]:

- Virgin Media has substantial advantages in competing for volumes at the wholesale level including the ability to offer access to an ultrafast network with the greatest coverage and with spare capacity;
- it can offer expansion and higher speed potential as DOCSIS continues to upgrade;
- that based on analysis by UBS, it is already economic for Virgin Media to wholesale; and

[736] BT Group response to January 2020 Consultation, page 5.
[737] CityFibre response to January 2020 Consultation, paragraphs 4.59-4.67.
[738] TalkTalk response to January 2020 Consultation, paragraph 4.127.
[739] Financial Times, September 2019. *Sky in talks to invest in Liberty Global fibre network.* [accessed 4 December 2019]. Capacity Media, February 2020. *Sky and Virgin Media further FTTH talks* [accessed 4 March 2020].
[740] BT Group response to January 2020 Consultation, page 15 and paragraphs 2.20- 2.23.

- that Ofcom is in a unique position to explore this issue in its forward-looking analysis.

8.82 Sky also commented that Virgin Media's anchor tenancy is insufficient to support its network investment and that therefore it is unsurprising that it is prepared to provide wholesale access.[741]

8.83 We agree that entry by Virgin Media is a possibility and that should it occur it would create a new form of direct competition to BT in wholesaling.

- Virgin Media has told us that [✂].[742]
- We understand that BT [✂]. In July 2019, BT commented that [✂] and that the [✂].[743]
- [✂].[744]
- We acknowledge that the concern that [✂].
- BT has also [✂].[745]

8.84 However, we do not think the potential for Virgin to compete in wholesaling is sufficient to conclude BT has no SMP.

8.85 To date there is no track record of Virgin Media competing in this way and therefore no evidence on the impact it would have in practice. [✂].[746] Documentary evidence from [✂].[747]

8.86 A number of other factors also contribute to the uncertainty around Virgin Media wholesaling. Virgin Media may also have other strategic priorities given the recent announcement of the proposed merger between Virgin Media and O2.[748] [✂].[749]

8.87 It will take time. ([✂][750]) for Virgin Media to start wholesaling, and volumes may have to be migrated gradually. [✂].[751]

8.88 Virgin Media's presence on the retail market means that wholesaling is likely to lead to some cannibalisation of its own customer and revenue base. [✂].[752] Wholesaling would also require an investment by Virgin Media. In particular, [✂].[753]

8.89 If Virgin Media were to start wholesaling, Virgin Media would be unable to supply all of a customer's requirements (for example, due to expected partial coverage, Sky or TalkTalk would still be reliant on BT to supply some of their customers). Openreach would continue to have a competitive advantage from its coverage. Other competing networks which

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[741] Sky response to January 2020 Consultation, page 10.
[742] Virgin Media response dated 5 March 2021 to the s.135 notice dated 26 February 2021, question 1.
[743] Openreach response dated 12 August 2019 to the s.135 notice dated 29 July 2019, question 1
[744] Openreach response dated 12 August 2019 to the s.135 notice dated 29 July 2019, question 1
[745] Openreach response dated 25 September 2020 to the s.135 notice dated 20 August 2020, question 2.
[746] [✂] response dated [✂] to s.135 notice dated [✂], question 2.
[747] [✂] response dated [✂] to the s.135 notice dated [✂], question 3.
[748] Telefónica. *Liberty Global and Telefónica to merge their UK operations* [accessed 4 March 2021].
[749] Virgin Media response dated 9 October 2020 to the s.135 notice dated 25 September 2020 question 1.
[750] Virgin Media response dated 8 September 2020 to the s.135 notice dated 22 July 2020, question 8.
[751] Sky response response dated 30 October 2020 to the s.135 notice dated 9 October 2020, question 3.
[752] Virgin Media response dated 8 September 2020 to the s.135 notice dated 22 July 2020, question 8.
[753] Virgin Media response dated 8 September 2020 to s.135 notice dated 22 July 2020, question 8.

represent an opportunity for countervailing buyer power are currently much smaller in scale.

8.90 Accordingly, while wholesale competition from Virgin Media is a possibility and should it occur it could have a significant market impact, the evidence on its likelihood and potential impact are not sufficiently strong to conclude that BT has no SMP.

Pricing

8.91 We have considered evidence that Openreach has set its headline prices to its regulated caps in 2018/19 and 2019/20. In the case of WLA this includes a charge control on both MPF and FTTC 40/10.[754]

8.92 CityFibre agreed with our proposed market power findings for WLA, but suggested that pricing to the cap is not necessarily compelling evidence of SMP because it could be normal commercial practice for supporting network investment.[755]

8.93 CityFibre also argued that we should take more account of evidence of geographic discounting by Openreach in our SMP assessment, and that such conduct is more compelling evidence of Openreach's SMP than the setting of prices up to the regulated cap.[756]

8.94 Based on discounted prices, Openreach was charging 2%[757] below the FTTC 40/10 cap in 2019/20 and was forecast to price at the cap in 2020/21.[758]

8.95 BT Group argued that Openreach was pricing below the cap in response to existing ultrafast competition from Virgin Media and to avoid the loss of volumes to its rivals, including Virgin Media.[759]

8.96 We recognise that Openreach has introduced a GEA discount scheme which meant that in 2019/20 the effective price paid for FTTC 40/10 was below the cap. We asked Openreach for documentary information on the commercial motivations for introducing the scheme. Our review of Openreach's board documents found that [✂].[760] As noted above, Openreach was forecast to be pricing at the level of the FTTC 40/10 cap in 2020/21.

8.97 Another factor is the link between pricing for MPF and GEA 40/10. We note that Openreach's price list shows it has priced to the MPF cap. Setting discounts below the cap for the faster GEA 40/10 product could reflect an anchor pricing effect from MPF.

8.98 We consider that Openreach pricing behaviour is consistent with a finding of SMP. We note discount schemes resulted in lower effective GEA 40/10 prices in 2019/20. [✂], evidence suggests that other factors were important drivers of pricing decisions. Openreach prices in

[754] Ofcom, 2018. Wholesale Local Access Market Review: Statement – Volume 1, paragraphs 9.3, 10.2.
[755] CityFibre response to January 2020 Consultation, paragraphs 4.49-4.52.
[756] CityFibre response to January 2020 Consultation, paragraph 4.54.
[757] Average price per BT 2019/20 RFS page 51 of £60.45 compared to Openreach Price list price of £61.51.
[758] Openreach response dated 1 March 2021 to the s.135 notice dated 3 January 2021, question 1.
[759] BT Group Consultation response, paragraphs 2.44, 2.51, 2.54, 2.56.
[760] Openreach response dated 10 September 2020 to the s.135 notice dated 20 August 2020, question 4.

2020/21 were set at the cap, indicating that it is regulation, not competition that currently constrains prices.

8.99 We also note that Openreach currently has three other pricing offers[761] which have an element of geographic discounting that will still be applicable on 1 April 2021. We discuss these in our consultation on these existing offers.[762]

External constraints

8.100 We have also considered the extent to which external constraints i.e. out-of-market products such as FWA and mobile broadband, which nevertheless may be a demand-side substitute for some consumers, may reduce BT's market power.

8.101 CityFibre[763] agreed with the view we expressed in the January 2020 Consultation that FWA would not exert a significant constraint on BT within the review period. TalkTalk[764] also agreed that FWA, mobile and satellite technologies would not act as a constraint, noting that at present fixed wireless is offered in few parts of the country and typically has lower speeds and capacity constraints. BT Group[765] disagreed and commented that other technologies (including FWA, Low Earth Orbit (LEO) satellites and meshed networks) would become increasing constraints. Sky did not comment on whether FWA should be considered an external constraint but noted that demand for FWA could reduce consumer demand for FTTP in the future.[766]

8.102 As outlined in Section 6, demand for these products is still relatively low, and coverage is limited. Although demand may grow over the review period, the timing and extent of this is unclear. Features of these products, as outlined in Annex 2, might limit the extent to which they are viable substitutes for many consumers. We therefore do not consider that these services will exert a significant competitive constraint on BT within the review period.

Finding that BT has SMP in WLA Area 3

8.103 We have considered whether BT has SMP in Area 3. As set out in Section 7, Area 3 accounts for 40% of postcode sectors and 30% of premises in the UK.

Market shares

8.104 BT's share of active broadband connections is currently over 90% ([✂]) in Area 3, as shown in Table 8.1. The share of its largest rival (Virgin Media) is marginal at less than 10% ([✂]).

[761] GEA-FTTP Local Marketing Pilot offer, GEA-FTTP Only Offer v2 and Volume commitment special offer on GEA-FTTC, G.fast, and GEA-FTTP.
[762] See consultation 'Existing Openreach FTTP offers with geographic pricing' published alongside this statement
[763] CityFibre response to January 2020 Consultation, paragraph 3.24.
[764] TalkTalk response to January 2020 Consultation, paragraph 4.29.
[765] BT Group response to January 2020 Consultation, paragraphs 2.8 and 2.60-2.63 and 3.34.
[766] Sky response to January 2020 Consultation, page 8.

Competition from existing presence of network infrastructure

8.105 Coverage analysis presented in Table 8.1 above shows that BT has significantly larger coverage than any of its rivals in Area 3. Documentary evidence from Openreach also suggests that it sees its own network presence as a source of strategic advantage. Specifically, one of its stated objectives in 2019 was to "sustain ubiquity and scale as sources of strategic advantage".[767]

Barriers to entry and expansion

8.106 We define WLA Area 3 as one in which there is not, and there is unlikely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks, as set out in Section 7. By definition these areas equate to postcode sectors where neither Virgin Media nor CityFibre is 'present'[768] based on their existing and planned build over the review period.

8.107 A number of other networks are planning to deploy in a range of areas, often in Area 3. [✂] is planning to [✂], Swish Fibre focuses on [✂] and Jurassic Fibre on towns and villages in the South West of England.[769] Others, including County Broadband, focus on rural communities.[770] These locations are typically less densely populated which means that they are less likely to be able to support network competition.

8.108 We recognise that other networks play an important role in providing fibre to rural areas. They have served rural communities at a time when Openreach has not been willing to extend its network to harder to reach areas, and they will continue to contribute towards the goal of providing fibre to most of the UK. But given the evidence available to us today, other networks are unlikely to provide the same competitive constraints as CityFibre or Virgin Media.

8.109 We consider that BT's substantially greater coverage in Area 3 will continue to give it an advantage over competing networks in the future. This is because ISPs are likely to continue to be reliant on access to BT's network to provide services across Area 3 during the review period. We have discussed above the evidence that ISPs are more reluctant to engage with other networks and that alternative networks have faced challenges in engaging with ISPs. We also consider that tenders are unlikely to act as a constraint on Area 3 given this lack of coverage by competing networks.

8.110 We have discussed above that, in the absence of *ex ante* regulation in the WLA market, BT could act to foreclose entry and expansion by rival operators, particularly where ISPs

[767] Openreach response dated 12 August 2019 to the s.135 notice dated 29 July 2019, question 1.
[768] As discussed in Section 7, we assess presence by reference to a 50% coverage threshold in each postcode sector.
[769] Jurassic Fibre response dated 18 August 2020 to s.135 notice dated 18 August 2020, question 4; Swish Fibre response dated 27 September 2020 to s.135 notice dated 17 August 2020, question 4; [✂] response dated [✂] in response to s.135 notice dated [✂].
[770] County Broadband response dated 25 September 2020 in response to s.135 notice dated 4 September 2020, question 4.

continue to be reliant on BT for many of their retail customers, as will be the case in Area 3.

8.111 We also discussed above the high take-up required for viable roll-out, and that this can vary between projects depending on cost. Building new networks is more likely to be higher cost in Area 3 due to lower density, and therefore require a higher level of take-up for entrants to break-even.

8.112 While BT is therefore likely to face some limited infrastructure-based competition in some parts of Area 3, it is not likely to lead to material and sustainable competition to BT. This is due to the high cost of building new networks, high level of required take up, challenges in securing wholesale customers and risks of anti-competitive behaviour in the absence of regulation.

Absence of countervailing buyer power

8.113 We discuss above the factors that would determine whether an ISP has countervailing buyer power.

8.114 We note Gigaclear's comment that if competing networks win contracts from State aid programmes to support roll-out in Area 3, they may achieve a level of take-up that could eventually provide a viable outside option and give ISPs countervailing buyer power in some parts of Area 3.[771]

8.115 However, as rival presence in Area 3 is very limited (the largest competing network, Virgin Media, has coverage of less than 10% of premises in Area 3), scope for countervailing buyer power in this area is very limited at present. The barriers to entry and expansion outlined above will limit the extent to which competing network operators are able to provide ISPs with a viable alternative to BT in large parts of Area 3 in the foreseeable future. ISPs will likely remain heavily reliant on BT, except potentially in areas where competing networks have won State aid contracts. Therefore, we would not expect countervailing buyer power to be a material constraint on BT in Area 3. TalkTalk agreed with this.[772]

Pricing

8.116 As outlined above, we consider that Openreach pricing behaviour is consistent with a finding of SMP. We note discount schemes resulted in lower effective GEA 40/10 prices in 2019/20. [✂], evidence suggests that other factors were important drivers of pricing decisions. Openreach prices in 2020/21 were set at the cap, indicating that it is regulation, not competition that currently constrains prices.

[771] Gigaclear response to January 2020 Consultation, paragraph 72.
[772] TalkTalk response to January 2020 Consultation, paragraph 4.126.

Finding that BT has SMP in WLA Area 3

8.117 We therefore conclude that BT has SMP in Area 3. As well BT's high market share, we consider that barriers to large scale entry in Area 3 are high and likely to be permanent and therefore expect BT's SMP in most parts of Area 3 to be permanent. Therefore, we are making a market power determination that BT has SMP in WLA Area 3.

Finding that BT has SMP in WLA Area 2

8.118 We have considered whether BT has SMP in Area 2. As set out in Section 7, Area 2 accounts for 60% of postcode sectors and 70% of premises in the UK.

Market shares

8.119 BT's share of active broadband connections is currently 61-80% ([✂]) in Area 2, as shown in Table 8.1. The next largest rival Virgin Media has a significantly lower share of 21-40% ([✂]).

8.120 If implemented, we consider that competing network operators' plans will represent a substantial injection of new competition in Area 2, leading to potential market share losses for BT during the review period.

Competition from existing presence of network infrastructure

8.121 Coverage analysis presented in Table 8.1 above shows that BT has significantly larger coverage than any of its rivals in Area 2.

8.122 In response to the January 2020 Consultation, BT Group argued that Virgin Media constrains Openreach via its position at the retail level.[773] We recognise Virgin Media plays an important role in retail competition. However, Virgin Media's potential share of WLA is currently more limited than Openreach's, in part because of its more limited coverage; having passed 61-70% ([✂]) of premises in Area 2. We note it is also currently a differentiated retailer through its focus on faster speeds, premium pricing and bundled products, which limits its potential market. We note that the proposed merger between Virgin Media and O2 may increase the indirect constraint Virgin Media exerts to the extent that Virgin Media can cross sell to the O2 customer base.

8.123 However, Openreach has a number of competitive advantages compared to Virgin Media including having a large installed base across other ISPs.

8.124 BT Group[774] and Openreach[775] argued that Virgin Media has a competitive advantage due to its current ability to offer faster speeds. We discuss these arguments in more detail below. In summary, we expect the focus of competition to be on speeds of less than 100Mbit/s, due to high levels of customer satisfaction with speed of service and low

[773] BT Group response to January 2020 Consultation, paragraph 2.19.
[774] BT Group response to January 2020 Consultation, paragraphs 2.13-2.20.
[775] Openreach response to January 2020 Consultation, paragraph 2.45.

willingness to pay for high speeds. Looking forward, we expect Openreach FTTP coverage to exceed Virgin Media network coverage by the end of this review.[776]

Barriers to entry and expansion

8.125 We define WLA Area 2 as one in which there is, or there is likely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks, as set out in Section 7. If implemented, operators' plans represent a substantial injection of new network build and competition in Area 2. As discussed in Section 7, Virgin Media is a material and sustainable competitor to BT, while CityFibre's roll-out would likely result in a second material and sustainable competitor. We are encouraged by these plans, and they are consistent with our view that, given appropriate regulatory support, large scale entry will occur during this review period. In addition, as discussed in Annex 3, the next largest network, Hyperoptic, has current coverage of [✂] premises and it has plans to increase this to c.5m by 2026, and we expect most of this to be in Area 2. Where Hyperoptic is competing with Openreach alongside Virgin Media or CityFibre, that will represent an important additional source of competition, adding to the intensity of competition. Stakeholders, for example TalkTalk, [777] have also commented on the potential for competition in the WLA market.

8.126 As discussed in Annex 3, PIA is a significant factor in many network investment plans to reduce dig costs and speed up network roll out. In Area 2 greater density means we think that, supported by PIA, the costs of new networks are low enough that barriers to entry may be overcome, though the outcome of this is uncertain. Entry is also dependent on being able to achieve significant retail take-up in order to realise economies of scale.[778] We also recognise that they are plans and that, as explained above, the extent and success of entry and expansion is dependent on our *ex ante* regulation of the WLA market preventing BT from foreclosing the entry and expansion of competing network operators.

8.127 We recognise that the potential constraint arising from tenders by larger ISPs is likely to be stronger in Area 2 where BT faces competition from CityFibre and Virgin Media. However, even in Area 2, wholesale customers are dependent on continued wholesale access to BT's network while the new competing networks are built and in some parts of Area 2 where alternative networks do not (and do not plan to) provide coverage.

Countervailing buyer power

8.128 There are features of the market which suggest that wholesale customers could leverage their position to get a good deal in Area 2. However, CityFibre[779] noted that at present there is no significant scope for ISPs to exert countervailing buyer power, given that there

[776] As discussed in Annex 3, Openreach has set a target of reaching 20m premises with FTTP by the mid to late 2020s, whilst Virgin Media has plans to increase its total coverage to nearly 17m premises.
[777] TalkTalk response to January 2020 Consultation, paragraph 4.151.
[778] Being able to realise economies of scope, in particular by using the network to sell leased lines, can also significantly improve the viability of the entry case.
[779] CityFibre response to January 2020 Consultation, paragraph 4.59.4.67.

is currently no legitimate alternative wholesaler. We expect substantial investment in network build during the review period and beyond, facilitated by PIA. Though we do not yet have evidence on how effective this will be in practice, if entry is successful this could increase the scope for countervailing buyer power in future.

8.129 As discussed above, we consider that entry by Virgin Media is a possibility and that should it occur it would create a new form of direct competition to BT in wholesaling and promote greater countervailing buyer power. However, there is substantial uncertainty around whether Virgin Media would make this change and how effective it might prove to be in practice.

8.130 Given this uncertainty, we consider that there is insufficient countervailing buyer power to constrain BT's position as a supplier of wholesale local access services in Area 2.

Pricing

8.131 As outlined above, we consider that Openreach pricing behaviour is consistent with a finding of SMP. We note discount schemes resulted in lower effective GEA 40/10 prices in 2019/20. Though [✂], evidence suggests that other factors were important drivers of pricing decisions. Openreach prices in 2020/21 were set at the cap, indicating that it is regulation, not competition that currently constrains prices.

Finding that BT has SMP in WLA Area 2

8.132 We therefore conclude that BT has SMP in Area 2 due to BT's high market share and the existence of barriers to entry and expansion. While we expect competition to increase and PIA to substantially reduce the sunk costs of network build, outcomes are uncertain. Together with the various challenges to new entrants described above, and noting that the existence of continued WLA regulation supports the new entry, our view is therefore that it would be premature to conclude that BT has no SMP in WLA Area 2 on the basis that there are no longer any significant barriers to entry. Therefore, we are making a market power determination that BT has SMP in WLA Area 2.

Additional stakeholder responses related to WLA SMP findings

8.133 In this subsection we address stakeholder comments on the following points:

a) BT does not have market power in ultrafast or FTTP;

b) BT does not have market power in areas of Virgin Media presence; and

c) we should consider whether BT and Virgin Media have joint SMP.

BT does not have market power in ultrafast or FTTP

8.134 As outlined in Section 6, we have defined a single product market based on all speeds and fixed network technologies. Our estimates of market shares in Table 8.1 are therefore based on all speeds and fixed network technologies.

8.135 In response to our December 2018 Consultation, BT noted that it does not currently operate a network able to supply ultrafast broadband services at scale, such that a market share analysis aggregating superfast and ultrafast was likely to over-estimate its market power.[780] BT Group and Openreach also disagreed with our proposed approach in the January 2020 Consultation, stating that Openreach does not have market power in ultrafast.[781] In particular, they argued that:

- Virgin Media is the established market leader in ultrafast, and benefits from first mover advantage, because of the greater coverage of its ultrafast network;
- Virgin Media has clear advantages in ultrafast including low incremental costs to connect additional end-customers to its network;
- Virgin Media has been rapidly building a retail position in ultrafast, currently supplies the vast majority (75-85%) of ultrafast connections, and benefits from having an anchor tenant (its retail arm);
- the proposed merger announced between Virgin Media and O2 will give Virgin Media access to O2's customer base, making it a stronger competitor to BT;
- it is likely that BT will supply fewer premises than Virgin Media over the entire review period unless it can meet its most ambitious annual run rate; and
- with area-by-area deployment ISPs will inevitably need to invest in systems for dual-sourcing.

8.136 We recognise that Virgin Media currently has a greater share of ultrafast connections. This is primarily because, for technical reasons, Virgin Media has been able to upgrade its network quickly and has migrated part of its customer base to these higher speeds.

8.137 As outlined in Section 1, Virgin Media has passed 15m premises with connections capable of providing ultrafast speeds and intends to have passed 17m premises by 2025. Although BT's network currently passes only 4m premises with ultrafast services, it has plans to roll out FTTP to 20m homes and businesses by the mid to late 2020s.[782] By the end of the review period, we therefore expect BT to be able to supply a substantial number of premises with ultrafast services.

8.138 As discussed in Section 6, we expect over the period of review, competition will be focussed on superfast broadband products. As set out in Section 2, network operators expect that by March 2025, only around 10% of connections will have download speeds of 300Mbit/s or faster.

8.139 As noted above, we have defined a single product market based on all speeds and fixed network technologies, and so do not separately conclude on BT's market power in a subset of services in this market. The importance of ultrafast and FTTP will grow over time, but we do not think the temporary speed advantages of Virgin's network materially affect BT's market power in this review period.

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[780] BT Group response to 2018 Approach to Geographic Markets Consultation, page 11.
[781] BT Group response to January 2020 Consultation, pages 3,6, paragraphs 2.27-2.38, 2.49, 2.55; Openreach response to January 2020 Consultation, paragraphs 1.6, 1.23, 2.48-2.51.
[782] BT, October 2020. *Half year to 30 September 2020* [accessed 4 March 2021].

BT does not have market power in areas of Virgin Media presence

8.140 BT Group argued that an assessment of market power in areas of Virgin Media presence would also lead to a no SMP finding.[783] In particular, BT Group argued that:

- Virgin Media exerts a greater indirect constraint on BT in these areas;
- Virgin Media has advantages relative to BT Group, as outlined above;
- PIA removes Openreach's cost, coverage and speed of provision advantage;
- that international comparisons, including the Netherlands, suggest sizable shares have been gained by competing cable operators and competing networks;
- we place too much weight on market shares when assessing competitive conditions in Virgin Media areas rather than the competitive pressure created by bidding dynamics; and
- that noting BT's market share of 60% is "consistent with a presumption of dominance" fails to reflect the dynamic nature of the market including the possibility of Virgin Media wholesaling.

8.141 Sky commented that in cable areas, there is greater scope for cable to respond competitively to limit migration and returns to new FTTP networks.[784] TalkTalk commented that the presence of Virgin Media in these areas is inadequate to act as an effective competitive constraint on Openreach, and that growing market share in areas where Virgin Media's DOCSIS network is present will be more difficult for competing networks.[785]

8.142 We recognise that BT's share of WLA is lower in the areas in which it competes with Virgin Media, as shown in Table 8.2 below. However, BT still has a high market share in these areas of above 50%.

8.143 As discussed above, we recognise that, in principle, potential wholesaling by Virgin Media would create direct competition for Openreach in wholesaling. However, there is substantial uncertainty around whether Virgin Media would make this change and how effective it might prove to be in practice.

8.144 As outlined above, we also recognise that Virgin Media exerts an indirect constraint on BT via its position at the retail level, and that this constraint is likely to be stronger in areas of Virgin Media presence. Though Virgin Media would be free to change its strategy in future, we note that it has historically competed by differentiating its retail offering to target customers with a higher willingness to pay through a focus on faster speeds, premium pricing and bundled products. As set out in Section 2, [✂].

[783] BT Group response to January 2020 Consultation, pages 13-15, paragraphs 2.17-2.20, 2.27, 2.35- 2.37, 2.53.
[784] Sky response to January 2020 Consultation, pages 7-8.
[785] TalkTalk response to January 2020 Consultation, paragraphs 3.6 and 4.159.

Table 8.2: Evidence relating to the areas of Virgin Media presence

	Areas of VM presence	Area 2	Area 3
BT, share of connections	[✂] 61-70%	[✂] 61-80%	[✂] 91-100%
Virgin Media, share of connections	[✂] 31-40%	[✂] 21-40%	[✂] 0-10%
Virgin Media coverage, % of premises passed	[✂] 71-80%	[✂] 61-70%	[✂] 0-10%

Source: Ofcom analysis of provider data.

8.145 In making our assessment we have used the geographic footprints of postcode sectors to determine presence. Because Virgin Media does not have ubiquitous coverage it does not cover all of the premises in the postcode sectors where it is present. At 71-80% [✂] coverage, compared with BT's nationwide coverage, Virgin Media's network is more limited in these areas. BT retains a majority share of connections in these postcode sectors.

8.146 We note, as discussed above, that BT's pricing is currently constrained by the MPF and GEA 40/10 price caps, indicating that it is regulation, not competition that currently constrains prices.

8.147 We note BT Group's comment on international comparators. However, evidence discussed above suggests that the extent of further competition in Area 2 (including areas of Virgin Media presence) would be reduced in the absence of *ex ante* regulation of the WLA market.

8.148 Openreach also argued that competitive dynamics may vary between areas reflecting Virgin Media presence and the pace of planned build by Openreach and other network builders.[786] We do not disagree, but consider that in all cases Openreach would likely be found to have SMP given the evidence presented above.

8.149 We therefore conclude that if we considered Virgin Media areas and non-Virgin Media areas separately, we would expect to find BT to have SMP in both.

Ofcom should consider whether BT and Virgin Media have joint SMP

8.150 TalkTalk agreed with our proposed SMP finding in Area 2. However, it submitted that we should also consider, in addition to the finding of unilateral SMP, whether Openreach and Virgin Media could be considered to have joint SMP.[787] We have found that BT alone has SMP in all of the relevant markets that we have defined, and therefore the question of joint SMP does not arise.

[786] Openreach response to January 2020 Consultation, paragraph 2.51.
[787] TalkTalk response to January 2020 Consultation, paragraphs 4.152-4.154 and 4.157.

WLA Area 1

8.151 As discussed in Section 7, we have considered whether a distinct Area 1 market exists for WLA. However, we conclude that competitive conditions in these postcode sectors are not sufficiently distinct from those in other postcode sectors in Area 2 for us to define a distinct Area 1 market for WLA in this review. Our consultation included our proposed approach to the assessment of SMP in Area 1, and TalkTalk commented on our proposed approach.[788] As we are not defining a WLA Area 1 market, we do not repeat our proposed approach to the assessment of SMP as this is not relevant for this review.

Stakeholder responses to our proposed LL Access SMP findings

8.152 In the January 2020 Consultation we proposed to find that BT has SMP in LL Access in the HNR Area, Area 2 and Area 3. We proposed that BT does not have SMP in the CLA.

8.153 Telefonica [789] and Vodafone[790] agreed with our proposed market power findings in the HNR Area and Areas 2 and 3. Telefonica[791] agreed with our proposed finding of no SMP in the CLA, but TalkTalk[792] and Vodafone[793] disagreed with this proposal.

8.154 BT Group[794] and Openreach[795] agreed that BT does not have SMP in the CLA but argued that BT also does not have SMP in the HNR Area.

8.155 BT Group also argued that Area 2 may well be found to be effectively competitive on a forward-looking basis once we update our analysis and consider the impact of PIA and tendering on competitive dynamics.[796]

8.156 Three also commented that our approach to analysing geographic markets (specifically the use of large postcode sectors and the 50% threshold) makes many non-competitive areas appear more competitive.[797] We disagree, for the reasons outlined in Section 7 and note that using smaller geographic units or increasing the threshold would not change our SMP findings.

8.157 SSE were neutral about our market power findings.[798]

[788] TalkTalk response to January 2020 Consultation, paragraphs 4.160-4.162.
[789] Telefonica response to January 2020 Consultation, page 28.
[790] Vodafone response to January 2020 Consultation, Part 2, page 54.
[791] Telefonica response to January 2020 Consultation, page 28
[792] TalkTalk response to January 2020 Consultation, paragraphs 7.72-7.95
[793] Vodafone response to January 2020 Consultation, paragraph 5.4
[794] BT Group response to January 2020 Consultation, paragraphs 2.6, 2.64.
[795] Openreach response to January 2020 Consultation, paragraph 7.48,
[796] BT Group response to January 2020 Consultation, paragraphs 2.7, 2.64, 2.68.
[797] Three response to January 2020 Consultation, page 30.
[798] SSE response to January 2020 Consultation, page 2.

8.158 BT Group argued that BT does not have market power in VHB services.[799] CityFibre argued that there is a separate product market for mobile backhaul, and that BT Enterprise has SMP in that market.[800] We discuss these arguments at the end of this section.

Leased lines access SMP analysis and evidence

8.159 In this subsection we set out our analysis and evidence underlying our SMP assessment across LL Access markets. In the following subsection we set out our assessment and SMP findings for each geographic market, drawing on this general evidence. We adopt the same approach to our SMP assessment as set out at the start of this section.

Evidence considered

8.160 Our analysis of market shares and presence of competing network infrastructure is based on data collected from providers using our statutory information gathering powers.[801] This evidence has been updated since our January 2020 Consultation to reflect more recent data. We have also updated our evidence on the potential to use the PIA remedy for LL Access to reflect the longer time period that has elapsed since introduction of the remedy in August 2019. We discuss this evidence below and in Annex 3.

8.161 Vodafone argued that we should consider additional data in our SMP assessment including the manner in which retailers purchase services, the reasons behind their behaviours, how wholesale connections are used for retail competition and how this varies between networks.[802] We have taken account of demand considerations in our assessment. In general competition from existing infrastructure presence and potential competition from network are the best evidence for evaluating competitive conditions but we have drawn on evidence relating to buyers where relevant (for example, below we discuss the potential for countervailing buyer power, particularly in relation to MNOs).

8.162 Vodafone also argued that we should use a wider data set which was identified in the 2019 BCMR appeal as part of our evidence base, including whether or not networks are already connected to a building with fibre.[803] It also argued we should carry out analysis of BT's RFS data on internal and external sales to understand reliance on Openreach.[804]

8.163 We consider below whether the additional evidence identified in the 2019 BCMR appeal, updated using more recent data, corroborates the other sources of evidence that we analysed in the January 2020 Consultation. Specifically, we discuss updated evidence on fibre-connected buildings in the CLA below. As set out in Annex 5, we have been unable to extend this analysis to other geographic markets.

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[799] BT Group response to January 2020 Consultation, paragraphs 2.69, 2.75-2.76.
[800] CityFibre response to January 2020 Consultation, paragraphs 3.134, 3.148-3.158.
[801] As explained in Annex 5
[802] Vodafone response to January 2020 Consultation, Part 2, pages 54 and 55.
[803] Vodafone response to January 2020 Consultation, Part 2, paragraphs 5.26-5.36
[804] Vodafone response to January 2020 Consultation, part 2, paragraphs 5.21-5.23.

8.164 We have not considered historical trends in BT's RFS over time. We consider our network reach and new connections analysis to be more reflective of the extent to which retailers will be reliant on Openreach's network over the forward-looking review period.

8.165 Three commented that we should build up a more rounded picture of competition in the CLA by revisiting the evidence gathered for this review, including the results of network reach analysis specifically for mobile sites, the postcode data, information on rival prices and changes in market share over time, maps of ducts and connections and evidence on digging costs and distances in the CLA.[805]

8.166 We consider evidence on some of these factors below. We have not explicitly considered information on rival prices over time. The information provided by our extensive review of documentary evidence on the drivers of Openreach's pricing included sufficient insights on market pricing. We have previously used maps as illustrative tools and consider it would not be practical to consider maps across the geographic areas we analyse, nor would it materially add to our other analysis of leased line networks.

Market shares

8.167 Table 8.3 below presents market shares for each of the identified geographic markets.

8.168 We have estimated market shares based on new customer ends connected in 2017, 2018 and 2019 combined as we consider this gives the most stable view of market shares. We would typically consider inventory shares to be the primary measure, however, we have concerns around the reliability of the inventory data.[806]

8.169 We also note Vodafone's comments that: [807]

a) connections in a given year are more likely to show the current level of competitive conditions;

b) grouping data of all rivals' market shares together is problematic as rivals do not operate as a group, and it is necessary to show whether individually they exert a competitive constraint; and

c) we have a history of market data which can be used to analyse how market shares have changed over time, including comparisons with data from the 2016 and 2019 BCMR reviews.

8.170 We present more detailed service shares by rival in Annex 5. We note that these are consistent with our findings.

8.171 We have considered how market shares have changed over time, based on 2017, 2018 and 2019 new connections. We set out results for each year in Annex 5. However, we have not compared this to data from the 2016 BCMR review as we do not consider this evidence

[805] Three response to January 2020 Consultation, page 25.
[806] See Annex 5
[807] Vodafone response to January 2020 Consultation, Part 2, page 55.

(gathered several years ago) would be helpful for our assessment of current and forward-looking competitive conditions.

Competition from existing presence of network infrastructure

8.172 We consider a network to be 'present' and able to compete for leased line customers if it is connected or very close to demand sites. Competitive constraints are strongest where networks are already connected to demand sites or very close such that they only require very short network extensions. As outlined in Annex 3, when a provider has no physical connection to a site, and needs to extend its network, BT will have a significant cost and time advantage. Costs and time to supply, and therefore the scale of this advantage, increase with the length of the network extension.

8.173 As discussed in Section 7 and Annex 3, PIA has the potential to substantially increase competition in LL Access, by extending the range over which existing networks will be able to compete. However, use of PIA remains in its early stages, and we do not yet know how far and on what timescale PIA might expand the effective reach of existing networks.

8.174 BT's existing nationwide network means it currently retains an advantage. Our analysis in Table 8.3 shows that competing networks are less likely than BT to have existing duct connections for demand sites. In addition, competing networks are typically further away from a demand site.

8.175 We discuss our modelling assumptions and approach in Section 7. This modelling measures network presence and captures networks with existing connections or which need very short network extensions. We use these as indicators of local network density and the closeness of competition.

8.176 Table 8.3 below presents the following indicators to assess the strength of competitive constraints from existing competing networks:

a) *Density of competing networks*. This estimates network presence i.e. networks that are either already connected to demand sites or very close such that they only require very short network extensions (which we consider to be able to compete for a customer).[808] We recognise in Section 7 that the approximations in our network reach model become more significant in less densely populated areas with relatively fewer business locations.

b) *Distance to nearest competing network*. This estimates how close competing networks are to demand sites. The average distances that are measured in our metrics will be considerably higher than actual distances.[809] We therefore present these results as ranges.

[808] This is equivalent to average network presence, i.e. the number of competing networks within 50m of demand sites in a given geographic area.

[809] There are a number of reasons for this. Sites that are already connected to networks will likely have a positive distance because distance is measured from the postcode centroid. Even where the postcode centroid is the location of the site, this may overestimate the distance as networks build to the edge, not centre, of sites. For more details see 2019 BCMR Statement, paragraph 5.79.

c) *Proportion of new connections with on- or off-net*. We present a breakdown of whether competing networks supplied customers on-net (i.e. using their own network, either with existing duct connections or where digging is required) or off-net (i.e. using access to third-party infrastructure network). This informs our view on the presence of competing network infrastructure and the ability of competing network operators to use it to compete for customers. A higher proportion of customers supplied on-net, suggests a higher presence of competing network infrastructure. On the other hand, a low proportion of customers supplied on-net suggests reliance on access to BT's infrastructure as BT's is much closer to demand sites compared to competing networks.

d) *Build vs. buy.* We consider the extent to which in practice competing networks have built, rather than supplied the customer off-net, where a leased line is outside of their existing network reach. Limited build activity is consistent with a weak competitive constraint on BT, as competing networks are more likely to require wholesale access to BT's network to supply customers.

e) *Dig distances.* We consider the extent to which, in practice, competing network operators dig to extend their network. Short dig distances may reflect the greater presence of competing networks in an area. They may also reflect, for example when combined with competing networks' lower propensity to dig, BT's greater competitive advantage in competing for new connections.

8.177 Individually each of these indicators provides a useful indication of the degree of competition in a particular area. We rely primarily on indicators from our modelling based on existing network build. We also consider qualitative evidence on build plans by other network operators. In our assessment below we consider the results of these indicators in the round.

8.178 We also consider whether additional evidence on fibre connected postcodes in the CLA corroborates the other sources of evidence that we analysed in the January 2020 Consultation. This analysis estimates the number of operators connected at an individual postcode. As buildings in dense urban areas often have their own postcode, we use this as a proxy to identify the proportion of buildings that have connections from Openreach and a given number of competing networks. A greater proportion of connections by competing networks suggests they would be well placed to supply a customer in that building and therefore provide a stronger constraint on BT.

Key evidence

8.179 Table 8.3 below presents the key evidence on competition for LL Access geographic markets; namely market shares and other metrics on the closeness of competition from existing infrastructure presence.

Table 8.3: Key Evidence for LL Access markets (network presence as at December 2019)

		CLA	HNR	Area 2	Area 3
Total postcode sectors (% of UK total)		278 (3%)	525 (5%)	5,430 (54%)	3,867 (38%)
Demand sites (% of UK total)		4,202 (3%)	9,085 (6%)	94,565 (64%)	40,041 (27%)
Connections (2017-19 combined) (% of UK total)		22,145 (11%)	20,848 (10%)	121,858 (60%)	38,909 (19%)
BT service share (2017-19 new connections combined)		[✂] 51-60%	[✂] 51-60%	[✂] 61-70%	[✂] 91-100%
Average number of competing networks present (i.e. within 50m)[810]		5.12	2.40	0.92	0.20
Proportion of demand sites with at least X competing networks present (i.e. within 50m) (cumulative)	**X=1**	99%	97%	76%	17%
	X=2	94%	79%	13%	2%
	X=3	84%	40%	2%	0%
	X=4	71%	14%	1%	0%
	X=5 or more	60%	6%	0%	0%
Average distance to X^{th}-nearest competing networks	**1st**	0-50m	0-50m	50-100m	1.5-2km
	2nd	0-50m	0-50m	350-400m	4-4.5km
	3rd	0-50m	100-150m	850-900m	7.5-8km
	4th	0-50m	200-250m	1.5-2km	11-11.5km
BT's breakdown of new connections (2017-19 combined)	**On-net (duct connected)**	[✂] 91-100%	[✂] 91-100%	[✂] 81-90%	[✂] 81-90%
Competing networks' breakdown of new connections (2017-19 combined)	**On-net (duct connected)**	70%	57%	48%	17%
	On-net (digging)	4%	13%	9%	2%
	Off-net	26%	29%	42%	81%
Competing networks' build vs. buy[811]		13%	32%	18%	3%
Median radial dig distance dug by competing networks (2017-19)		7m	11m	16m	18m

Source: Ofcom analysis of provider data. Annex 5 provides a more detailed description and explanation of the analysis undertaken.

Barriers to entry and expansion

8.180 As discussed in Section 7, in the period covered by this review we expect the potential for new network build to be more dynamic than in the past. We expect Virgin Media and CityFibre to provide material and sustainable competition to BT where they are present. We also recognise that there are leased lines only networks which provide an additional important source of competition in some geographic areas.

8.181 Where operators do not have networks in a given area or are not close to demand sites, there are barriers to entry and expansion. In response to the January 2020 Consultation, BT Group argued that PIA leads to lower barriers of entry.[812] We agree that PIA has the potential to reduce barriers to entry and expansion, and to substantially increase competition in leased lines over this review period. This is through facilitating investment plans for networks providing both broadband and leased lines, and leased lines only. Under the modified greenfield approach, we take into account PIA in this SMP assessment as it is imposed upstream of LL Access. However, as discussed in Annex 3, the impact of PIA in LL Access over the review period remains uncertain.

8.182 If implemented, Virgin Media and CityFibre's rollout plans discussed in Section 7 represent a substantial injection of new competition, including in the provision of leased lines.

8.183 As discussed in Annex 3, the evidence we have gathered from leased line-only providers points to a more modest network investment outlook, though some leased line network providers have indicated plans to build:[813]

- A small number [✂] have plans to build.
- [✂] confirmed that their plans are not contingent on public funding.
- [✂] has plans to build over the period to 2023, although the majority of these are scheduled to complete by 2021. Similarly, [✂] plans were scheduled to be completed by early 2021.

8.184 In general, the level of detail these networks were able to provide on the geographic location of their build was limited. [✂] provided a list of towns and cities. We are therefore unable to map this to our geographic markets but expect the majority of this

[810] Rival networks present means that the network is either connected or very close to a demand site such that it only requires a very short network extension to connect a customer.
[811] We determine rivals 'build' (on-net dig) as a percentage of rivals 'build' (on-net dig) plus rivals 'buy' (off-net) in relation to the supply of a leased line to a customer's site outside their existing network reach. Further information may be found in Annex 5.
[812] BT Group response to January 2020 Consultation, paragraphs 2.68, 2.97, 2.99-2.107.
[813] CenturyLink response dated 25 September 2020 to the s.135 notice dated 15 June, question 1; Colt response dated 23 July 2020 to the s.135 notice dated 12 June 2020, question 1; Eircom response dated 24 August 2020 to the s.135 notice dated 15 June 2020, question 1; euNetworks response dated 27 July 2020 to the s.135 notice dated 15 June 2020, question 1; FibreSpeed response dated 27 July 2020 to the s.135 notice dated 15 June 2020, question 1; GTT-EMEA response dated 8 September 2020 to the s.135 notice dated 15 June 2020, question 1; MS3 Networks response dated 23 July 2020 to the s.135 notice dated 15 June 2020, question 1; SSE response dated 23 July 2020 to the s.135 notice dated 15 June 2020, question 1; Verizon response dated 20 July 2020 to the s.135 notice dated 12 June 2020, question 1; Vodafone response dated 24 July 2020 to the s.135 notice dated 15 June 2020, question 1; WPD response dated 28 August 2020 to the s.135 notice dated 15 June 2020, question 1; Zayo response dated 19 August 2020 to the s.135 notice dated 12 June 2020, question 1.

build to be in the HNR Area. [✂] provided details of [✂] indicating some limited build in non-HNR areas.

8.185 BT Group commented that: [814]

a) there is material existing and planned competitive leased line infrastructure in UK towns and cities; and

b) we have discounted plans as evidence because the precise timing and location is unknown but this uncertainty creates competitive pressure.

8.186 In contrast, Three commented that based on the roll-out plans disclosed in their access tails tender, BT would face no competing leased line access networks for MNO sites in large parts of Area 2, the HNR Area and the CLA.[815]

8.187 We agree that the existing and planned build has the potential to be material and disagree with Three's position that there is no potential that BT would face competition in the supply of MNO sites in many areas. [✂].[816] We also understand that [✂][817] and that [✂].[818] Over time we would expect a greater proportion of Three's mobile access tails to be in an area of either CityFibre or Virgin Media network presence.

8.188 We also note that operators' current build plans in Area 2 may be dependent on our *ex ante* regulation in the LL Access market. BT could have the incentive, and in the absence of regulation the ability, to foreclose the entry or expansion of competing network operators, to limit this potential competitive threat. This could result from actions including offering geographic discounts to wholesale prices in areas where it faces potential competition from competing networks, other commercial terms including certain kinds of volume discounts. We discuss these issues further in Volume 3, Section 7.

8.189 Vodafone also argued that the excess construction charge scheme[819] acts as a barrier to entry to LL Access as it shares some of the costs of network extension across Openreach's customer base, meaning providers do not pay the full cost of individual extensions. This reduces the cost of network extensions for telecoms providers buying wholesale services from Openreach compared to alternative network providers.[820]

8.190 We discuss the specific impact of potential network expansion in each geographic market below.

[814] BT Group response to January 2020 Consultation, paragraphs 1.6 and 2.107.
[815] Three response to January 2020 Consultation, paragraph 5.2.
[816] [✂] response dated [✂] to the s.135 notice dated [✂], question 3
[817] [✂] response dated [✂] to the s.135 notice dated [✂], question 4
[818] [✂] response dated [✂] to the s.135 notice dated [✂], question 3
[819] Openreach funds network extension costs up to £2,800 from a central fund built up from all connection charges. Providers requesting network extension only directly pay for costs exceeding this £2,800 level.
[820] Vodafone response to January 2020 Consultation, Part 2, paragraphs 5.32.

Countervailing buyer power

8.191 Whether a wholesale customer has countervailing buyer power will rely on a number of factors including whether they have sufficient choice of alternative suppliers and the volumes they wish to purchase.

8.192 In the majority of the UK (Areas 2 and 3) customers currently have limited choice of supplier, though choice will be greater in the HNR Area and the CLA. We expect substantial investment in network build during the review period and beyond, facilitated by PIA. Though we do not yet have evidence on how effective this will be in practice, if entry is successful this could increase the scope for countervailing buyer power in future.

8.193 In general, many customers will tend to purchase low volumes, which are unlikely to be large enough for them to exert buyer power.

8.194 A potential exception to this is MNOs. As set out in Section 2, MNOs require a large volume of circuits to connect a large number of sites across the UK. However, while the larger volumes may give MNOs the ability to negotiate better deals compared to other customers, their need for wide coverage will mean they are currently reliant on Openreach in large parts of the UK. Our assessment of network presence in relation to MNOs shows no material difference in the average number of competing networks present for MNO sites relative to non-MNO sites in each market (see Section 6) – indicating that MNOs currently face a similarly limited choice of supplier to other leased line customers.

8.195 BT Group[821] and Openreach[822] argued that leased line access markets are characterised by strong countervailing buyer power in many areas, particularly where contracts are tendered. Telefonica suggested we should consider evidence from tenders or other forms of request for proposal to assess the actual state of competition.[823] We consider that the presence of tenders and RFPs for mobile backhaul does not in itself demonstrate buyer power. As noted, the ability to exert buyer power depends on the strength of viable alternatives. As noted above, we expect the strength of alternatives to grow with investment in network build during the review period and beyond, facilitated by PIA, though the outcome of this is uncertain.

8.196 There is no evidence that Openreach is currently offering deals which particularly appeal to MNOs over other leased lines customers. Openreach currently offers cheaper VHB pricing to customers which commit to longer-term contracts (e.g. 3 and 7 years). For example, customers buying an EAD 10GB LA circuit can access a 37% rental discount by switching from 1-year to a 7-year term pricing. However, this pricing is available to all customers, not just MNOs. Evidence from Openreach[824] shows [✂].

[821] BT Group response to January 2020 Consultation, paragraphs 2.108-2.115
[822] Openreach response to January 2020 Consultation, paragraph 4.20.
[823] Telefonica response to January 2020 Consultation, paragraph 4.3.
[824] Openreach response dated 28 January 2021 to the s.135 notice dated 14 January 2021, question 1.

8.197 We also understand that longer-term pricing is not attractive to all MNOs (in particular, [✂].[825] [✂].

8.198 We discuss the potential for countervailing buyer power to constrain BT in each geographic market below.

Pricing

8.199 In 2019/20 Openreach was subject to a CPI-CPI cap on its <=1Gbit/s services and its >1Gbit/s (very high bandwidth (VHB)) services[826] in BT Only and BT+1 areas.[827] Openreach was also subject to a fair and reasonable pricing condition in HNR areas, reflecting the greater degree of network reach and competition compared to BT Only and BT+1 areas. BT was not found to have SMP in the CLA and therefore was not subject to any pricing remedies.

8.200 BT Group commented that pricing pressures, ahead of network build, are strong in the CLA, the HNR areas and Area 2 and that BT Enterprise had not been successful in winning tenders because its rivals were using more competitive infrastructure alternatives.[828] It also commented that: [829]

a) if we considered updated pricing trends we would find that prices have continued to exhibit a downward trend across all speeds; and

b) we have not fully taken account of the impact of PIA and tendering markets for large high-value contracts, which are reflected in pricing trends.

8.201 We have taken account of the impact of tendering markets in our discussion of countervailing buyer power above.

8.202 We discuss below the evidence on Openreach's pricing to the cap, as well as documentary evidence on the drivers of pricing gathered from Openreach and alternative network providers.

Pricing below the <=1Gbit/s cap in BT Only and BT+1 areas

8.203 Openreach has largely held prices for <=1Gbit/s services constant since 2019. [830] However, due to the timing of previous price cuts, this has resulted in pricing below the level

[825] [✂] response dated [✂] to the s.135 notice dated [✂], question 2
[826] For services of 1Gbit/s and below, the price caps imposed did not depart significantly from cost as these services were subject to a cost-based charge control prior to the BCMR 2019. However, for VHB services, we imposed a safe-guard price cap at the then current level of prices, which was significantly above accounting cost.
[827] The 2019 BCMR Section defined geographic markets based on the presence of rival leased lines infrastructure. These BT Only and BT+1 areas (combined) broadly correspond to Areas 2 and 3 (combined) as defined in this review, though some of these postcode sectors are now classified as HNR. See 2019 BCMR Section 10 for details on price caps applicable in these markets. Ofcom, 2019. *Promoting competition and investment in fibre networks: review of the physical infrastructure and business connectivity markets – Volume 2* (2019 BCMR), section 10.
[828] BT Group response to January 2020 Consultation, paragraph 2.67.
[829] BT Group response to January 2020 Consultation, paragraphs 2.6, 2.97, 2.106-2.107.
[830] See Openreach EAD price list.

required by the cap.[831] Under the terms of the charge control, Openreach is permitted to raise prices slightly in second charge control period (2020/21). This period has not yet ended, but we observe from Openreach's price list that is has largely held prices constant.

8.204 We have collected internal documents from Openreach which suggest that the pricing reductions made in 2018/19 were driven by [✂].[832] We note that Openreach has generally not reduced prices for these services since the 2019 BCMR, where we found SMP. We therefore consider Openreach's pricing against the <=1Gbit/s LL Access charge control is not inconsistent with a finding of SMP.

Discounts in CLA and HNR areas

8.205 Openreach has offered discounts on connection charges for <=1Gbit/s services in Openreach 'Gigabit Drop Zones' (the CLA and HNR areas as defined by Ofcom in the 2019 BCMR), with prices 40% below the national level (£1,125). Openreach argued that this shows competition is well established in HNR areas and that it has been required to price aggressively in the face of growing competition.[833] Our review of Openreach's board documents[834] found that [✂].

8.206 We agree that the HNR areas are more competitive. However, other factors could also be relevant, such as lower average costs in these areas arising from higher business density. We also note the discount applies to connections, suggesting it is more focussed on new customers. Openreach internal documents also indicate that [✂].[835] The level of the discount has not changed since the 2019 BCMR Statement, though has been extended to other areas in line with the expansion of areas classified as HNR in the 2019 BCMR. We therefore conclude that Openreach's discounts in the CLA and HNR areas are likely to reflect the greater level of competition in these areas.

[831] In 2019/20, the maximum permitted price increase for <=1Gbit/s services in BT Only and BT + 1 areas was 0% in nominal terms. In fact, Openreach decreased the (weighted) average change in the price of the services in this basket by 2.1% (based on our assessment of BT's compliance submission for the first charge control period – available here). The decrease was driven by a cut in the rental price of 1Gbit/s EAD and EAD LA products, however the bulk of these price cuts occurred on 1 October 2018 (i.e. prior to the latest charge controls coming into effect), and Openreach has largely maintained prices at that level since. This means that average prices in 2019/20 were below the average for 2018/19 (and hence, due to the way compliance is assessed, below the level required by the cap). The following illustrative example gives the intuition. Assume that in the first half of the preceding year the price of a service was £12 and in the second half it was £8. The average price for that preceding year was thus £10. In the next year the price remains unchanged at £8. Prices in the second year would thus be 20% (i.e. £8 compared to £10) lower than the average in the preceding year, even though there had been no further change.

[832] Openreach response dated 10 September to s.135 notice dated 20 August 2020, question 4.

[833] Openreach response to January 2020 Consultation, paragraph 7.42.

[834] Openreach response dated 10 September to s.135 notice dated 20 August 2020, question 4.

[835] Openreach response dated 10 September to s.135 notice dated 20 August 2020, question 4.

Term discounts for VHB services

8.207 Openreach set its 1-year headline prices to the cap for VHB services in 2019/20 in BT Only and BT+1 areas.[836] We note that Openreach also offers nationwide 3, 5[837] and 7-year term rental discounts for VHB services, providing substantial discounts below the 1 year price (and therefore below the cap) of around 15-35%.[838] Although Openreach [✂].[839]

8.208 However, the cap on VHB services is a safeguard, rather than being set at Openreach's costs, meaning prices below this safeguard level are likely to remain profitable for Openreach. This is supported by analysis of Openreach's profitability, which suggests that Openreach returns on its VHB portfolio (including discounts) tend to be high and in excess of WACC. In the financial year 2019/2020, Openreach made an average return on Mean Capital Employed of around [✂] on VHB products. This varied between geographic markets, in the range of [✂].[840]

8.209 We also understand that longer-term pricing is not attractive to all MNOs (in particular, [✂].[841]

8.210 BT Group commented that pricing pressures, ahead of network build, are strong in the CLA, the HNR areas and Area 2 and that BT Enterprise had not been successful in winning tenders because its rivals were using more competitive infrastructure alternatives.[842] Three commented that dark fibre providers are much more competitive than BT due to lower ongoing annual maintenance charges, which are fixed during the contract term, which might suggest an increasing competitive constraint on BT.[843] However, these pricing pressures are conditional on competing networks reaching sufficient scale to supply a meaningful portion of customer requirements. In the absence of *ex ante* regulation in the LL Access market we consider BT could foreclose rival entry and expansion in Area 2 (including by dark fibre providers) through, for example, targeted discounts.

Conclusion on pricing in leased line services

8.211 We consider Openreach's pricing is not inconsistent with a finding of SMP in the HNR Area, Area 2 and Area 3. However, we place more weight on our assessment of the presence of competing network infrastructure outlined above. Openreach has largely held charge-controlled prices for <=1Gbit/s services constant since the 2019 BCMR, where we found SMP. Openreach also offers term discounts on VHB services but accessing these requires

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[836] The maximum permitted price increase was 0% in nominal terms. Based on compliance information provided to Ofcom by BT, the prices of the vast majority of products in the basket were unchanged for the first charge control period. Charges for some OSA connection and rental services were cut by c.30%. However, these services are likely to have very small volume. [✂].

[837] In practice, the discount applied to a 5-year term commitment only requires a 3-year commitment, as there are no ETCs after 3 years.

[838] Ofcom calculation comparing total connection and rental charges paid at discounted price for the relevant term, with the 1-year price for the same duration, using Openreach EAD and OSA price lists.

[839] Openreach response dated 28 January 2021 to the s.135 notice dated 14 January 2021, question 1.

[840] [✂] Ofcom calculations based on BT Regulatory Financial Statements.

[841] [✂] response dated [✂] to the s.135 notice dated [✂], question 2.

[842] BT Group response to January 2020 Consultation, paragraph 2.67.

[843] Three response to January 2020 Consultation, page 18.

commitment for significantly longer time periods. In addition, the cap on VHB services is a safeguard, rather than being set at Openreach's costs, meaning prices below this safeguard level remain profitable for Openreach.

Finding that BT has SMP in LL Access Area 3

8.212 We have considered whether BT has SMP in Area 3. Area 3 is made up of postcode sectors in which there is not, and there is unlikely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks. Area 3 accounts for approximately 40,000 demand sites and 19% of 2017-2019 connections (39,000 customer ends).

Market shares

8.213 BT has a very high share of 2017-2019 connections (combined). We estimate BT's share to be 91-100% ([✂%]). The share of its largest rival (Virgin Media) is materially lower, at less than 10% [✂%]. When considering connections in each individual year from 2017 to 2019, we also find that BT's share of connections in each year is above 80% (as set out in Annex 5).

Competition from existing presence of network infrastructure

8.214 The infrastructure indicators presented in Table 8.3 above show that there is very limited competing network infrastructure in Area 3. This supports the view that BT faces very limited infrastructure-based competition in Area 3. We acknowledge that some other networks located in Area 3 might offer leased lines. However, evidence is that the volumes will be small and that the presence of these other networks would not have a material impact on competitive market conditions.

8.215 In Area 3 most demand sites have no competing networks present (i.e. within 50m) and, on average, there is substantially less than one competing network connected or close to demand sites. A very small proportion (just 2%) of demand sites have access to two or more competing networks nearby.

8.216 Where competing networks have supplied new connections, on average, they had existing duct connections for just 17% of the customer ends they connected, a significantly smaller proportion compared to BT (which had existing duct connections for 81-90% ([✂]%) of connections). In addition, competing networks are typically further away from a demand site – on average the nearest competing network is 1.5-2km away.

8.217 Competing networks are unlikely to dig such long distances due to the cost of network extensions outlined in Annex 3. This is supported by competing networks' behaviour between 2017 and 2019. Competing networks in Area 3, on average, chose to build for just 3% of their new customer ends where they did not already have an existing duct connection and the median distance dug was short (18m).

Barriers to entry and expansion

8.218 We consider that there are very limited prospects of potential competition that can effectively constrain BT in Area 3 by March 2026. As discussed in Annex 3, we reviewed responses from network providers on their future network expansion plans over the next five years. Overall, market developments are relatively limited and will not materially affect the level of competition in Area 3 over this review period.

Absence of countervailing buyer power

8.219 We consider that there is insufficient countervailing buyer power to constrain BT's position in Area 3. This is because most businesses will have no or limited choice of alternative supplier to BT. Hence, customers cannot make a credible threat to switch volumes from BT to alternative suppliers.

Pricing

8.220 As discussed above, we consider Openreach's pricing is not inconsistent with a finding of SMP. Openreach has largely held charge-controlled prices for <=1Gbit/s services constant since the 2019 BCMR, where we found SMP. Openreach also offers term discounts on VHB services in all areas, but accessing these requires commitment for significantly longer time periods. In addition, the cap on VHB services is a safeguard, rather than being set at Openreach's costs, meaning prices below this safeguard level remain profitable for Openreach.

Finding that BT has SMP in LL Access Area 3

8.221 We therefore conclude that BT has SMP in Area 3 in the provision of LL Access services. As well BT's high market share, we consider that there is limited competitive constraint on BT's market power from existing or potential competing network presence. Therefore, we are making a market power determination that BT has SMP in LL Access Area 3.

Finding that BT has SMP in LL Access Area 2

8.222 We have considered whether BT has SMP in Area 2. Area 2 is made up of postcode sectors in which there is, or there is likely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks. Area 2 accounts for approximately 95,000 demand sites and 60% of 2017-2019 connections (122,000 customer ends).

Market shares

8.223 BT has a very high share of 2017-2019 connections (combined). We estimate BT's share to be 61-70% ([✂]%). The share of its largest rival (Virgin Media) is materially lower, at 21-30% ([✂]%). When considering connections in each individual year from 2017 to 2019, we also find that BT's share of connections in each year is above 60% (as set out in Annex 5).

Competition from existing presence of network infrastructure

8.224 The infrastructure indicators presented in Table 8.3 above show that currently there is limited competing network infrastructure in Area 2. This supports the view that BT currently faces limited infrastructure-based competition in Area 2. On average, there is around one competing network connected or close to demand sites in Area 2. A small proportion (13%) of demand sites currently have access to two or more competing networks nearby.

8.225 In addition, competing networks are typically further away from a demand site than in the HNR Area – on average the nearest competing network is 50-100m away, and the second nearest over 350m away. Competing networks in Area 2 are unlikely to dig long distances. On average, they chose to build in just 18% of their new connections where they did not already have an existing duct connection and the median distance dug was short (16m). As discussed in Section 7 and Annex 3, PIA has the potential to extend the range over which existing networks will be able to compete. However, use of PIA remains in its early stages, and we do not yet know how far and on what timescale PIA might expand the effective reach of existing networks.

8.226 We note that BT faces a greater competitive constraint from Virgin Media in Area 2 than from other competing networks. Virgin Media is the second largest provider with a physical infrastructure network in Area 2 after BT, hence is likely to have existing duct connections to more premises compared to other competing networks.

8.227 We note BT Group's point that Virgin Media has recently won contracts from Three and Vodafone for the supply of their LL Access services for mobile backhaul.[844] This suggests that Virgin Media's market shares may increase over the review period. We note that Virgin Media's coverage enables it to better compete against BT and to win contracts for the supply of mobile backhaul services than other competing networks. However, we do not agree with BT Group that the existence of these contracts is sufficient evidence that BT is effectively constrained in Area 2.

8.228 As discussed above, Three commented that based on the rollout plans disclosed in their access tails tender, BT would face no competing leased line access networks for MNO sites in large parts of Area 2.[845] This means that at present MNOs remain dependent on BT in parts of Area 2. We expect competition to grow substantially during the review period. However, the degree to which that will occur is subject to some uncertainty, and in the absence of *ex ante* regulation in this market we consider BT could foreclose rival entry or expansion (including by dark fibre providers) by, for example, targeted discounts on its active products.

8.229 We agree that the proposed merger between Virgin Media and O2 may increase the incentive for Virgin Media to supply O2's mobile backhaul requirements.[846] However, it

[844] BT Group response to January 2020 Consultation, paragraph 1.6.
[845] Three response to January 2020 Consultation, paragraph 5.2.
[846] BT Group response to January 2020 Consultation, paragraph 1.6.

may also reduce incentives to supply backhaul requirements to other MNOs.[847] However, the extent and timing of this in practice is uncertain. [✂].[848]

8.230 Accordingly, while we think that the constraint from existing networks in Area 2 may increase in the future, the likelihood and extent of this is not sufficiently certain for us to consider that BT is effectively constrained by the existing presence of network infrastructure.

Barriers to entry and expansion

8.231 We define LL Access Area 2 as one in which there is, or there is likely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks, as set out in Section 7. If implemented, operators' plans represent a very substantial injection of new network build and competition in Area 2. As discussed in Section 7, Virgin Media is a material and sustainable competitor to BT, whilst CityFibre's rollout would likely result in a second material and sustainable competitor. We are encouraged by these plans, and they are consistent with our view that given appropriate regulatory support large scale entry will occur during this review period.

8.232 We also recognise that there are leased lines only networks which provide an additional important source of competition in some geographic areas, and evidence discussed in Annex 3 suggests some build from these networks in Area 2.

8.233 As discussed above, PIA has potential to reduce barriers to entry and substantially increase competition. However, the evidence we have gathered shows that leased line use cases are emerging, and the impact of PIA in LL Access over the review period remains uncertain.

8.234 Moreover, the extent and success of entry and expansion is also dependent on our *ex ante* regulation of this market preventing BT from frustrating this. We therefore conclude that the evidence on existing and planned build in Area 2 is supportive of an SMP finding.

Absence of countervailing buyer power

8.235 BT Group argue that if we were to consider countervailing buyer power exerted through tenders, we would find that it is strong in tendering markets.[849]

8.236 We consider that there is insufficient countervailing buyer power to constrain BT's position in Area 2. This is because many businesses currently will have limited choice of alternative supplier to BT. Also, in general, customers will tend to purchase low volumes, which are unlikely to be large enough for them to exert buyer power. We expect substantial investment in network build during the review period and beyond, facilitated by PIA. Though we do not yet have evidence on how effective this will be in practice, if entry is successful this could increase the scope for countervailing buyer power in future.

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[847] This issue is discussed in the CMA issues statement for the proposed merger. CMA, January 2021. *Anticipated joint venture between Liberty Global Plc and Telefónica S.A. Issues statement*, paragraphs 35-39.
[848] [✂] response dated [✂] to the s.135 notice dated [✂], questions 1 and 2
[849] BT Group response to January 2020 Consultation, paragraph 2.6.

8.237 We recognise that MNOs and public sector customers (as discussed in Section 2) may be more likely to purchase through tenders than enterprise customers. While MNOs purchase larger volumes, which may give them the ability to negotiate better deals compared to other customers, their need for wide coverage will mean they are currently reliant on Openreach in large parts of the UK. In the absence of *ex ante* regulation, BT could take actions to discourage switching of circuits where alternative networks are present through the terms they set for circuits where BT is the only provider.

Pricing

8.238 As for Area 3, we consider that Openreach's pricing against its LL Access charge controls is consistent with our finding of SMP.

Finding that BT has SMP in Area 2

8.239 We therefore conclude that BT has SMP in Area 2 in the provision of LL Access services. As well as BT's high market share, we consider that there is limited competitive constraint on BT's market power from existing or potential competing network presence. We think that competition in Area 2 is likely to increase in this review period. However, the likelihood and extent of this is not sufficiently certain for us to reach a no SMP finding on a prospective basis for the period of this review. Therefore, we are making a market power determination that BT has SMP in LL Access Area 2.

Finding that BT has SMP in the HNR Area

8.240 We have considered whether BT has SMP in the HNR Area. The HNR Area is made up of BT+2 postcode sectors.[850] HNR Area postcode sectors account for approximately 9,000 demand sites and 10% of 2017-2019 connections (21,000 customer ends).

Market shares

8.241 BT has a high market share of 2017-2019 connections (combined). We estimate BT's share to be 51-60% ([✂]%). The share of its largest rival (Virgin Media) is materially lower, at 21-30% ([✂]%). When considering connections in each individual year from 2017 to 2019, we also find that BT's share of connections in each year is above 50% (as set out in Annex 5). We consider this high market share in the round, together with the other evidence set out below.

Competition from existing presence of network infrastructure

8.242 The HNR Area is made up of postcode sectors with two or more competing networks to BT. Therefore, there is likely to be some level of infrastructure-based competition in most parts of these areas. On average, more than two competing networks are present (i.e.

[850] These are postcode sectors where at least 65% of demand sites have two or more alternative networks to BT within 50m.

within 50m) in the HNR Area and 40% of sites currently have access to three or more competing networks.

8.243 Evidence for the HNR Area suggests that, for a large proportion of users, BT will be duct-connected while competing networks will often need to extend their networks to connect the customer:

a) BT had duct in place when connecting 91-100% ([✂]%) of new connections over the period 2017 to 2019, while competing networks, on average, had duct for 57% of their new connections;

b) a significant minority (21%) of businesses have fewer than two competing networks present (i.e. within 50m); and

c) our modelling indicates that on average, the two closest competing networks to BT are within 50m, but the third closest is over 100m away from demand sites.

8.244 We consider that BT's competitive advantage from being duct-connected will hinder competing networks' ability to compete effectively to some extent. This is reflected in how competing networks chose to supply new customer ends. On average, when competing networks were not connected, they chose to dig for 32% of the new connections and the median dig distance was very short (11m). As discussed in Section 7 and Annex 3, PIA has the potential to extend the range over which existing networks will be able to compete. However, use of PIA remains in its early stages, and we do not yet know how far and on what timescale PIA might expand the effective reach of existing networks.

8.245 As outlined above, we do not agree that the existence of contracts between Virgin Media and MNOs is sufficient evidence that BT is effectively constrained in the HNR Area. BT's share of MNO inventory is [✂%] in the HNR Area. As above, we agree with BT Group that the proposed merger between Virgin Media and O2 may increase the incentive for Virgin Media to supply O2's mobile backhaul requirements. However, it may also reduce incentives to supply backhaul requirements to other MNOs.[851] However, the extent and timing of this in practice is uncertain.

8.246 While BT therefore faces some level of infrastructure-based competition from existing networks in these areas, we consider the current density of competing network infrastructure insufficient to impose an effective competitive constraint on BT.

Barriers to entry and expansion

8.247 The strength of competition is likely to increase further over this review period. Virgin Media and CityFibre's roll-out plans will expand leased lines coverage in the HNR Area. We also expect some network build by leased line only networks, much of which is likely to be in the HNR Area.

[851] This issue is discussed in the CMA issues statement for the proposed merger. CMA, January 2021. *Anticipated joint venture between Liberty Global Plc and Telefónica S.A. Issues statement*.

8.248 Openreach argues that the development of alternative and competing network infrastructure continues to increase in HNR areas, and that PIA provides a means for alternative network providers to connect high value or densely clustered businesses.[852] BT Group argues that potential network build increases competitive pressure ahead of actual rollout [✂].[853]

8.249 As outlined above, we disagree with Three that there is no potential that BT would face competition in the supply of MNO sites in large parts of the HNR Area. As discussed above, PIA has potential to reduce barriers to entry and increase competition. However, the evidence we have gathered shows that leased line use cases are emerging, and the impact of PIA in LL Access over the review period remains uncertain.

8.250 Accordingly, while we think that competition in the HNR Area may eliminate BT's SMP in the future, this is not sufficiently certain for us to reach a no SMP finding on a prospective basis for the period of this review.

Absence of countervailing buyer power

8.251 BT Group[854] and Openreach[855] argued that there was strong countervailing buyer power in the HNR Area. We consider that there is likely to be insufficient countervailing buyer power to constrain BT in the HNR Area. While more businesses will have a choice of alternative supplier to BT, most will be purchasing low volumes. Though MNOs are an exception purchasing in greater volumes, they will remain reliant on Openreach in other areas, and absent regulation Openreach could act to disincentivise switching to competing networks in the HNR Area (for example, through discounts based on national volume commitments).

Pricing

8.252 As discussed above Openreach has provided discounts on connection charges in existing HNR areas, which Openreach argues shows competition is well established.[856] Our assessment of this pricing indicated that [✂] but pricing could reflect other factors, such as lower average costs in these areas arising from higher business density. In addition, [✂].

8.253 Openreach also offers term discounts on VHB services in all areas, but accessing these requires commitment for significantly longer time periods. In addition, the cap on VHB services is a safeguard, rather than being set at Openreach's costs, meaning prices below this safeguard level remain profitable for Openreach.

[852] Openreach response to January 2020 consultation, paragraphs 7.45-7.47.
[853] BT Group response to January 2020 consultation, paragraphs 2.106-2.107.
[854] BT Group response to January 2020 Consultation, paragraph 2.97.
[855] Openreach response to January 2020 Consultation, paragraph 4.20.
[856] Openreach response to January 2020 Consultation, paragraph 7.42.

8.254 We conclude that Openreach's pricing in HNR areas is likely to reflect the greater level of competition in those areas. However, we place more weight on our assessment of the presence of competing network infrastructure outlined above.

Finding that BT has SMP in the HNR Area

8.255 We therefore conclude that BT has SMP in the HNR Area in the provision of LL Access services, but this is finely balanced. The proximity of existing competing network infrastructure provides a degree of competitive pressure on BT. BT's discounts in HNR areas are likely to reflect, in part, greater levels of competition in these areas. The potential for further network deployments means that the strength of competition in these areas is likely to increase over this review period, with the potential for them to emerge as fully competitive in future review periods.

8.256 However, we do not conclude these areas are yet effectively competitive. BT retains a high market share. In just under half of cases, competing networks do not have existing duct connections to demand sites, which means they face additional costs when competing for businesses relative to Openreach, which is duct connected to the vast majority of sites. In terms of BT's discounts, [✂], another factor in BT's pricing may be lower costs in these built up areas.

8.257 Therefore, we are making a market power determination that BT has SMP in the HNR Area.

Finding that BT does not have SMP in LL Access in the CLA

8.258 In the 2019 BCMR Statement we concluded that BT did not have SMP in the CLA in respect of wholesale leased line access in relation to the review period 2019-21.[857] This finding was upheld by the Competition Appeal Tribunal, following an appeal by TalkTalk and Vodafone.[858]

8.259 We have considered whether BT has SMP in the CLA for the period of this review (2021-26). The CLA is made up of postcode sectors in central London. We consider it has unique competitive conditions, with a high degree of competition from leased lines only networks. The CLA accounts for approximately 4,000 demand sites and 11% of 2017-19 connections (22,000 customer ends).

Market shares

8.260 BT has a high market share of 2017-19 connections (combined). We estimate BT's share to be 51-60% [✂]. The share of its largest rival [✂] is materially lower at 21-30% [✂]. When considering connections in each individual year from 2017 to 2019, we also find that BT's share of connections in each year is above 50% (as set out in Annex 5). Service shares in

[857] 2019 BCMR, paragraphs 6.165-6.169. This followed our previous finding of no SMP in 2016 BCMR, when the CLA was deregulated.
[858] *TalkTalk Telecom Group plc and Vodafone Limited v Ofcom (BCMR 2019)* [2020] CAT 8

the CLA are broadly consistent with our findings in the 2019 BCMR. We consider this high market share in the round, together with the other evidence set out below.

Competition from existing presence of network infrastructure

8.261 The CLA is made up of postcode sectors with a significant density of large businesses and a significant number of operators present. Therefore, there is likely to be infrastructure-based competition in most postcode sectors. On average, over five competing networks are present at demand sites in the CLA, 94% of sites have access to two or more competing networks and 60% have access to five or more. This indicates that the vast majority of demand sites have a good choice of alternatives to BT. It shows an increase in density of competing network infrastructure since the 2019 BCMR analysis – where 90% of sites had access to two or more competing networks and 46% had access to five or more. This high level of presence is likely to constrain BT in the CLA.

8.262 Vodafone argued that the costs, complexities and delay associated with network extensions in the CLA mean that it does not extend its network except in rare circumstances, and that other providers are likely to be in a similar position.[859] Our analysis does suggest that competing networks rarely build when they do not already have duct in place (on average they chose to dig for just 13% of such connections, with a median dig distance of just 7m). As discussed in Section 7 and Annex 3, PIA has the potential to extend the range over which existing networks will be able to compete. However, use of PIA remains in its early stages, and we do not yet know how far and on what timescale PIA might expand the effective reach of existing networks.

8.263 However, our evidence for the CLA suggests that competing networks are significantly more likely to be duct-connected than in other areas. Competing networks had duct in place when connecting 70% of connections, though BT was duct connected for almost all ([✂]) connections. These metrics are in line with equivalent analysis from the 2019 BCMR.

8.264 Taken together, this suggests that demand sites are likely to have a range of providers already connected or very close. For a given site, even if an individual provider may be unlikely to build, the likelihood is that other providers are already connected or sufficiently close and this existing presence provides an effective constraint on Openreach.

8.265 Three commented that only a few alternative networks offered mobile access tails in the CLA, with some having very limited footprint.[860] Three also commented that BT would face no competing mobile access networks in large parts of the CLA.[861] However, as set out in Section 6, proximity to competing network infrastructure is broadly the same for both MNOs and enterprise access customers in each geographic market defined.

[859] Vodafone response to January 2020 Consultation, part 2, paragraph 5.45.
[860] Three response to January 2020 Consultation, page 25.
[861] Three response to January 2020 Consultation, paragraph 5.2.

Barriers to entry and expansion

8.266 The strength of competition is likely to increase over this review period as we expect an increase in the density of competing network networks in light of the availability of a PIA remedy. We also asked leased lines-only operators for information on their rollout plans and understand [✂].[862]

8.267 We therefore expect the constraint on BT to increase further during the review period due to the prospects of network build in the CLA using PIA. This means that there is an even stronger case for a no-SMP finding in our review period than was the case in BCMR 2019.

Countervailing buyer power

8.268 We consider that businesses will have greater countervailing buyer power in the CLA than in other areas. This is because most businesses will have a choice of alternative supplier to BT. Hence, the threat of switching volumes from BT to alternative suppliers is more credible than in other areas. However, the strength of this threat is linked to the volumes a given customer purchases, meaning buyer power may be stronger for some customers purchasing large volumes (such as MNOs).

Pricing

8.269 Competitive pressure in the CLA is reflected in Openreach's pricing and in its internal competitive assessment. As discussed above, Openreach offers discounts in the CLA as in HNR areas. This includes discounts on connection charges for <=1Gbit/s service and term discounts for VHB services. As discussed above, our assessment of this pricing indicated that [✂] but pricing could reflect other factors, such as lower average costs in these areas arising from higher business density.[863] We conclude that Openreach's pricing in the CLA is likely to reflect the greater level of competition in this area.

8.270 As discussed above, Vodafone commented that the analysis of pricing to the cap, special offers and BT's internal pricing papers, fails to make the case that prices in the CLA are set at competitive level. We have not reached any conclusion as to whether prices in the CLA are at a competitive level or not. We do not think it is necessary to reach such a finding in circumstances where evidence on the presence of competing network infrastructure is sufficient to conclude that there is no SMP.

Finding that BT does not have SMP LL Access in the CLA

8.271 We therefore conclude that BT does not have SMP in the provision of LL Access services in the CLA. Although BT has a high market share (above 50%), the density of competing

[862] [✂] response dated [✂] to the s.135 notice dated [✂], question 1.
[863] BT's internal documents suggest that its wholesale charges in the CLA were constrained by competition. For example, we note that a paper provided by [✂]. We note that [✂].

networks and prospects of competition based on PIA suggest that BT is effectively constrained in the CLA.

8.272 As discussed above, we have also considered data on fibre connections at postcodes by share of circuit volume for the CLA. We find that one or more competing networks are providing active fibre connections in postcodes accounting for 60-70% [✂] of connection volumes. This additional data on fibre connections is consistent with our conclusion that BT does not have SMP in the CLA.

Additional stakeholder responses related to LL Access SMP findings

8.273 In this subsection we address the following issues raised by stakeholders:

a) BT's market power in the supply of VHB; and

b) BT Enterprise's market power in the supply of mobile backhaul.

BT's market power in the supply of VHB

8.274 BT Group commented that the supply of VHB services is characterised by large sophisticated buyers issuing tenders for large contracts that are fiercely contested, often require a significant amount of new network build and where providers mix and match own new build with existing own network and leased capacity from a variety of providers.[864] BT Group also commented that the market for VHB services shares many of the same competitive dynamics as LLU backhaul and data centre traffic, which are largely deregulated due to strong competition. In making these comments, we also understand BT considers the supply of VHB to be synonymous with the supply of mobile backhaul.

8.275 As outlined in Section 6, we have defined a single product market based on all speeds. Our estimates of service shares in Table 8.3 are therefore based on all speeds. However, we have also assessed service shares for VHB circuits. This shows Openreach's share is over 50% in the HNR Area and Areas 2 and 3, but lower (31-40%) in the CLA. We note Openreach has offered term-discounts below the VHB safeguard cap, which could also drive an increase in its share. However, as noted above, the cap on prices of VHB services is a safeguard, rather than being set at Openreach's costs, meaning prices below this safeguard level remain profitable for Openreach.

8.276 We recognise that the supply of VHB and mobile backhaul services may be characterised by the existence of large tenders, and that there is likely to be significant competition for these tenders. However, evidence presented in Annex 5 indicates that networks do not tend to dig significantly further when supplying VHB services. The median dig distance for both new VHB connections was 20m compared with 14m for slower speeds.

8.277 We define a single product market across bandwidths, and our SMP finding is based on an assessment of competition across that market. However, we consider that BT's high share, along with our discussion of other evidence on network infrastructure suggests BT

[864] BT Group response to January 2020 Consultation, paragraphs 2.69, 2.75-2.76.

continues to have market power in relation to VHB circuits in the areas where we find SMP in this review.

Mobile backhaul

8.278 CityFibre consider there is a separate product market for mobile backhaul and that BT Enterprise has SMP in that market.[865] CityFibre argue that MNOs are almost entirely reliant on BT Enterprise (and therefore the Openreach network) as a provider of mobile backhaul connectivity in rural areas as BT Enterprise is co-located at all BT exchanges, whereas MNOs and rivals to BT Enterprise are co-located at a more limited set of exchanges, typically in urban areas.[866] CityFibre noted it is concerned about anti-competitive conduct by BT Enterprise. euNetworks also expressed similar concerns about anticompetitive behaviour in the mobile backhaul market by BT.[867]

8.279 BT Enterprise's provision of managed services is downstream of the wholesale LL Access markets we are considering in this review.

8.280 In relation to the LL Access markets that are the subject of this review, as outlined in Section 6, we have defined a single product market across all LL access customers. Our estimates of market shares in Table 8.3 are therefore based on all customer types. However, we have also considered service shares for circuits provided to MNOs. This shows that BT's share of supply to MNOs remains high ([✂%] across the UK (excluding the Hull Area) and over [✂]% in each geographic market). Our assessment of network presence in relation to MNOs shows no material difference in the average number of competing networks present for MNO sites relative to non-MNO sites in each market (see Section 6). Though we expect MNO use of their own and competing networks for backhaul is most likely to increase over the review period, they are likely to remain reliant on Openreach to provide nationwide coverage. Absent regulation of the LLA market, Openreach could exploit this reliance to set commercial terms which hamper the entry and expansion of competing networks. If we were to consider services provided to MNOs separately, this analysis would be consistent with SMP in the markets where we find SMP in this review.

Inter-exchange connectivity

8.281 As set out in Sections 6 and 7, we have defined a separate product market for IEC services and have defined each new BT+2 exchange[868] and each BT+1 and BT Only exchange as a distinct geographic market. We therefore carry out an SMP assessment for these markets, taking account of sub-national differences in conditions.

[865] CityFibre response to January 2020 Consultation, paragraphs 3.134, 3.148-3.158.
[866] Colocation at exchanges enables BT Wholesale to take advantage of Openreach's nationwide network
[867] euNetworks response to January 2020 Consultation, paragraphs 81-86.
[868] Each BT+2 exchange that has not previously been deregulated.

Stakeholder responses to our SMP findings in IEC markets

8.282 In the January 2020 Consultation, we proposed to assess SMP based on Principal Core Operator (PCO) presence at a BT exchange.[869] We proposed that BT has SMP at its exchanges where only BT (BT+0), or BT plus one PCO (BT+1), are present (directly or indirectly).[870]

8.283 TalkTalk agreed with using PCOs connected directly and indirectly as an indicator of competitive constraint and that nearby PCOs not connected directly or indirectly should not be taken into account in determining SMP.[871]

8.284 Openreach said that we had underestimated the competitive constraint that nearby networks pose, especially in BT+1 exchanges. They said the availability of PIA meant that there was not a high barrier to entry to providing inter-exchange connectivity services from these exchanges. Openreach said that undertaking the SMP assessment at cohort level (i.e. BT only or BT+1) rather than at individual exchange meant that we had not taken into account that there may be some exchanges to which it was very easy for PCOs to build to and high barriers to entry may not exist.[872]

8.285 Vodafone said that we should not only consider the ability to provide circuits from an exchange but the ability to provide resilient backhaul at an exchange. It also argued that we should consider the existence of competing network or network sites within the vicinity of BT-only exchanges.[873]

8.286 TalkTalk commented that IEC geographic markets should be based on the number of competing networks present on each route. It also argued that if we retained our approach to defining each exchange as a geographic market, we should find SMP on routes between BT+2 exchanges, and apply remedies where no competing networks or only one competing network can provide a circuit (since competing networks are different at each end). It also argued we should conduct quantitative analysis to demonstrate that routes between BT+2 exchanges are sufficiently competitive.[874]

8.287 TalkTalk also said that we should reassess our list of PCOs. It argued operators defined as PCOs should be able to substitute effectively for Openreach volumes, rather than being used as a complementary operator. It commented that the current list appears too long and that we should redraw it on the basis of objective, verifiable criteria.[875]

8.288 We address these points below. We have also updated our analysis using more recent input data from network operators, which we discuss further below.

[869] January 2020 Consultation, Volume 2, paragraph 9.111.
[870] January 2020 Consultation, Volume 2, paragraphs 9.112-9.120.
[871] TalkTalk response to January 2020 Consultation, paragraph 7.107.
[872] Openreach response to January 2020 Consultation, paragraphs 7.67-7.72
[873] Vodafone response to January 2020 Consultation, Part 2, paragraphs 4.34-4.35 and 4.29.
[874] TalkTalk response to January 2020 Consultation, paragraphs 7.57-7.61 and 7.108-7.109.
[875] TalkTalk response to January 2020 Consultation, paragraphs 7.62-7.65.

Approach to assessing SMP

8.289 To assess competitive conditions, we follow a similar approach to the SMP assessment as in the 2019 BCMR Statement, which is:

a) We use the number of competing networks that are present at a BT exchange to assess the strength of competition faced by BT on circuits to or from that exchange.[876, 877]

b) We only count the presence of PCOs, which we define as "a subset of telecoms providers that have substantial core infrastructure and the capacity to provide wholesale leased lines to other providers".[878] We think only PCOs can provide an effective constraint on BT.

c) We count the PCO as present at an exchange if the PCO has direct or indirect connection at an exchange: [879]

i) Directly connected: the PCO has network equipment at a BT exchange and purchases External Cablelink[880] to connect to its own network; or

ii) Indirectly connected: a customer (e.g. TalkTalk) purchases the External Cablelink to a PCO's network, which may not have network equipment at the BT exchange.

d) At some exchanges there are PCOs that are not connected but have network nearby. We recognise this as a source of potential competition. However, providers have a significant time and cost advantage from being connected compared to a nearby network that would have to dig to install new duct. While PIA can reduce the cost and time of network build (as highlighted by Openreach), PIA has only relatively recently been available to operators of networks providing only leased line services. The impact of PIA in IEC markets over the review period remains uncertain. This means that networks that are close to BT exchanges but not currently connected provide a weaker constraint than those which are at present at an exchange. We set out our reasoning in the paragraphs below.

Identification of PCOs

8.290 In identifying PCOs we considered telecoms providers that:

- own their own infrastructure;
- have a substantial footprint; and
- have the capacity to offer a wholesale IEC service to other telecoms providers.

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[876] 2019 BCMR Statement, paragraphs 8.37-8.41.
[877] We note - similar to our view in 2019 BCMR Statement- we do not undertake a comprehensive assessment of market shares because a) there are a number of practical constraints, which make the calculation of market shares challenging and b) once a network operator is present at an exchange it provides a competitive constraint even if its share of current sales is low. For more details see 2019 BCMR Statement paragraphs 8.34-8.36.
[878] 2019 BCMR Statement, paragraph 8.55-8.63.
[879] For more detail see 2019 BCMR Statement, paragraph 8.42-8.49.
[880] External Cablelink is a product Openreach provides to connect between nodes within a BT exchange, and to other networks nearby.

8.291 In our judgment these criteria are appropriate as they are indicative of clear demand from the exchange and an ability to supply backhaul services in competition with BT. For example, if an infrastructure provider has some presence, but does not have the capacity to offer a wholesale service because it has an insufficient footprint, we do not think it would provide a sufficient competitive constraint on BT and so should be excluded from the list of PCOs.

8.292 We do not consider it would be appropriate to set a fixed threshold for these criteria, as suggested by TalkTalk.[881] We take a judgment on whether a PCO meets the above criteria in the round, based on our assessment of the evidence on PCO activities, including the specific exchanges where they are present and their actual wholesale activity.

8.293 Based on these criteria, we identify the following telecoms providers as PCOs: CenturyLink, Cityfibre, Colt, eir, SSE, Virgin Media, Vodafone and Zayo. [882]

8.294 We disagree with TalkTalk's suggestion that this list is too long. Each PCO has the capability to supply competitive backhaul services and act as a constraint on Openreach.

Constraints from nearby networks

8.295 In general, we would expect the barriers to entry to be lower (and therefore the incentives to build greater) the closer a network operator's existing network is to the BT exchange. Such entry, either actual or potential, could provide a constraint on BT at exchanges where the competing network is sufficiently close. However, we consider BT's competitive advantages (e.g. ubiquitous network present at all its exchanges) result in significant cost and time advantages over operators looking to extend their networks to a particular exchange. In particular:

a) While the costs of digging depend on distance, costs can still be material for relatively short distances.

b) Any kind of network build takes time, requiring planning (including potential traffic management and wayleaves) as well as installation time. Evidence discussed in the 2019 BCMR shows, for example, that BT was able to supply a new Inter-exchange connectivity circuit in approximately [✂] 21-30 working days in 2017 where it already had fibre in place or approximately [✂] 41-50 days when it had duct and only needed to blow fibre. This compares to an average time to provide of [✂] 111-120 working days for an Access circuit in 2017 where new duct was required. This is likely to be the closest comparator for the time it would take a competing network operator to extend its network to a particular exchange.[883] We consider that time to supply by networks

[881] TalkTalk response to January 2020 Consultation, paragraph 7.65.
[882] [✂].
[883] See paragraph 6.26 in Annex 6 of the 2019 BCMR Statement. We consider a CI Access circuit is a relevant comparator for provision by a rival operator since we would expect PCOs to extend their network from an existing node near to a BT exchange. This means dig distances and locations could be more comparable to a CI Access circuit than a complete inter-exchange circuit between two exchanges. These figures are a result of Ofcom analysis.

which are nearby will be longer (and in some cases significantly more so) than for BT even with PIA given BT has a ubiquitous network present at all its exchanges.

8.296 We recognise that PIA can reduce the cost and time of network build. However, PIA has only relatively recently been available to operators of networks providing only leased line services. The impact of PIA in IEC markets over the review period remains uncertain. Given this uncertainty, we place significant weight on existing presence at an exchange.

Vodafone's comments on "resilient" backhaul

8.297 We do not consider Vodafone's suggestion of considering the ability to provide resilient backhaul to be practical or necessary and discussed similar arguments in the 2019 BCMR.[884] To properly assess "resilient" presence, we would need significantly more granular information on PCO networks and the extent to which routes are diverse. It is unclear whether we could assess this accurately given limitations of PCO data. In any case, we do not consider that the absence of a resilient connection at an exchange prevents a PCO from providing a competitive constraint on BT. The decision on resilience for a PCO reflects a choice between risk of outage and cost, and it may be more appropriate to have greater resilience at some exchanges than others. Those purchasing IEC services have a similar choice, and some may prefer to have slightly less resilient routes for lower cost.

TalkTalk's comments on using routes rather than exchanges as the basis for our analysis

8.298 We considered TalkTalk's suggested route-by-route methodology in the 2019 BCMR.[885] We remain of the view that it would be onerous for both us and for telecoms providers. It is also unclear that it would necessarily provide better results than those achieved through a methodology based on PCO presence, as it would not take into account the extent to which different routes can be substitutes.

Conclusion on approach to SMP assessment

8.299 We have therefore concluded that we should count a PCO as present at an exchange if it is directly or indirectly connected (see above), but not where a PCO is not connected but has network nearby. Even where a PCO network is very close, but not connected, barriers to entry remain and the constraint on BT is weaker.

Update of analysis

8.300 We have updated our analysis since the January 2020 Consultation using more recent input data from network operators. The process we followed is described in Annex 6, together with the results of our updated analysis.

8.301 We have identified 22 additional exchanges which now meet the BT+2 criteria. We are required to carry out an analysis of these markets to review our previous market power

[884] 2019 BCMR, paragraph 8.67-70
[885] 2019 BCMR, paragraph 8.66.

determination and to consider whether to modify the SMP conditions that apply to the provision of IEC services at these exchanges. We therefore carry out an SMP analysis of these new BT+2 exchanges below.

8.302 We have also identified 69 exchanges where our analysis suggests that PCO presence has decreased.[886] Consistent with our approach in 2019 BCMR, we have undertaken a simple test of PCO presence at BT exchanges. As outlined in Annex 6, a main driver behind the change in results between 2019 BCMR and this review, was an error in the data provided in response to 2019 BCMR which had overstated competitive network presence. As such, we consider the data we have received through statutory powers, as part of this review, to be a better reflection of PCO presence outside BT exchanges.

8.303 We have therefore decided to categorise exchanges as BT Only, BT+1 or BT+2 on the basis of our updated analysis.

BT has SMP at BT Only and BT+1 exchanges, but not at BT+2 exchanges

8.304 In this section we set out our assessment of whether BT has SMP in any of the geographic markets we have identified. As set out in Section 7, we consider that each BT exchange is its own geographic market and we, therefore, assess presence at each BT exchange. For brevity, we present our SMP assessment for the following groups of exchanges:[887]

a) BT Only exchanges;

b) BT+1 exchanges; and

c) BT+2 exchanges.[888]

8.305 As discussed above, we consider that the constraint from nearby but unconnected PCOs is weaker than those that are present. Therefore, we disagree with Openreach's view that this approach misses individual exchanges where constraints on BT are materially stronger than the assessment of exchanges as a group would imply.

8.306 Table 8.4 below summarises our key evidence and proposed SMP findings.

Table 8.4: Key evidence for IEC services markets

	BT Only	BT +1	BT +2
SMP proposal	SMP	SMP	No SMP
Number of exchanges	4,275	745	22 (of 549 total BT+2 exchanges)

[886] 44 moving from BT+2 or more to BT+1 and 25 moving from BT+1 to BT Only.
[887] We use Main Distribution Frame identifiers (MDF IDs) as references to BT exchanges. There are a very small number of exchanges (10) which have closed and had their MDF moved to another exchange building. In these instances, we apply the measure of presence for the "gaining" exchange MDF ID to the moved MDF ID from the closed exchange. This affects the presence finding for just 16 MDF IDs, and ultimately 6 exchanges. See 2019 BCMR 8.107-8.113. A list of co-located MDF exchanges can be found in Schedule 4.
[888] As noted above, our SMP assessment is limited to the new BT+2 exchanges (i.e. those not previously deregulated).

PCO network (median distance)	Nearest PCO: 2.6km	Second PCO: 250m

Source: Ofcom analysis of provider data.

BT has SMP at BT Only exchanges

8.307 BT is the only operator present at BT Only exchanges.[889]

8.308 The nearest PCOs are on average 5.6km (median 2.6km) away from the exchange and are likely to impose very weak competitive constraint on BT, even in the presence of PIA. As set out in Annex 3, evidence suggests that competing network build to BT Only exchanges is likely to be limited over this review period, particularly given the long build distances (on average) and lower demand at these exchanges.

8.309 We recognise that some BT Only exchanges may have the potential to be served by competing networks using PIA where distances are shorter. However, short distances will apply only at some exchanges, and the potential for use of PIA is uncertain. As discussed in Volume 3, Section 1, we also take the presence of nearby networks into account in the scope of our remedies.

8.310 We therefore conclude that BT has SMP for IEC services at BT Only exchanges over this review period. We note that no respondents disagreed with this proposition in response to the January 2020 Consultation.

BT has SMP at BT+1 exchanges

8.311 Some telecoms providers use non-Openreach PCOs from BT+1 exchanges, which indicates a greater constraint on BT than on routes from BT Only exchanges. However, we do not consider that one competing PCO present at an exchange is enough for effective competition in these markets for the following reasons:

a) Evidence suggests providers are reliant on BT to some extent for services at BT+1 exchanges.[890]

b) In a market in which one of the two suppliers publishes its prices, the other provider has the ability and incentive to either just match or slightly undercut its prices. This would lead to a weakening of competitive pressure.[891]

8.312 Openreach said that we had underestimated the strength of competition from nearby networks especially at BT+1 exchanges, and the availability of PIA meant that there was not a high barrier to entry to providing inter-exchange connectivity from these exchanges.

[889] We also consider that there is no countervailing buyer power because users of regulated wholesale access services (WLA and LL Access) will be reliant on BT for connections from BT Only exchanges as there is no other choice of supplier.
[890] For example, in BCMR 2019 we noted that Sky indicated that it purchases [✂] to connect to and from BT+1 exchanges [✂]. TalkTalk [✂]. BCMR 2019, paragraph 8.86
[891] Evidence [✂]. See 2019 BCMR Statement, paragraph 8.88.

8.313 We recognise that the constraint from nearby networks at BT+1 exchanges is likely to be higher than at BT Only exchanges. Demand for inter-exchange connectivity is likely to be higher and the distance to the second network is on average shorter than at BT Only exchanges. The distance to the nearest second network is 875m on average, with a median distance of 250m. We note that the nearest second network is within 50m and 100m for 118 and 224 exchanges respectively. The shorter distances mean the costs and average time to provide are likely to be lower compared to BT Only exchanges. However, whilst PIA can reduce the cost and time of network build, the timing and degree to which it will have an impact is uncertain.

8.314 Therefore, we have concluded that nearby networks do not pose a sufficiently strong or certain constraint to justify a "no SMP" finding. As discussed in Volume 3 Section 1, we reflect the potential to promote further competition at BT+1 exchanges in our remedies assessment.

8.315 We therefore conclude that BT has SMP for IEC services at BT+1 exchanges over this review period.

BT does not have SMP at BT+2 exchanges

8.316 In the 2019 BCMR, we concluded that BT does not have SMP at BT exchanges where at least two other PCOs are present for a number of reasons.[892] In summary:

- BT's competitive advantages are likely to be less material where there are two or more PCOs present. This is because customers are likely to have a greater choice of supplier who can meet their specific needs in a timely and cost-effective way.
- The incentive to match (or slightly undercut) prices due to one of the suppliers publishing its prices is significantly weaker when there is a third competitor.
- Evidence showed that even though some telecoms providers are still using Openreach for a significant percentage of their connectivity needs between BT+2 or more exchanges, others are multisourcing. This remains the case based on our updated evidence.

8.317 We disagree with TalkTalk's suggestion that we should find SMP on routes between BT+2 exchanges, for the purposes of applying regulation, where no competing networks or only one competing network can provide a circuit on a given route (since competing networks are different at each end) . For the reasons set out above, we consider that the presence of two other PCOs is sufficient to provide competitive inter-exchange connectivity. As different routes can be substitutes, this need not require that the same PCOs are present at each exchange.

8.318 As set out above, 22 exchanges have been newly classified as BT+2, having been classified as BT Only or BT+1 in the 2019 BCMR. We consider that the reasoning we set out above applies equally to those exchanges. We therefore conclude that BT does not have SMP for IEC services at those BT+2 exchanges over this review period.

[892] 2019 BCMR paragraph 8.95-8.106.

8.319 We discuss transitional arrangements for the withdrawal of regulation at the 22 new BT+2 exchanges in Volume 3, Sections 5 and 6.

Competition concerns

8.320 BT's SMP in each of the markets discussed above gives rise to a number of competition concerns. Absent regulation, BT's SMP would give it the incentive and ability to engage in forms of conduct that could distort competition and/or harm consumers. BT also has the ability to design its network, and make strategic investment decisions, which in the absence of regulatory measures designed to address its SMP could lead to poor outcomes for consumers.

8.321 These forms of conduct fall in broad terms into two categories:

a) Exclusionary behaviour by BT to prevent potential competing networks from competing in the wholesale access market or to prevent them from gaining market share, thereby protecting its market position. This type of behaviour can lead to competitors being excluded from the market, in the long-run leading to poorer outcomes for end-customers;

b) Exploitative behaviour by BT at the expense of its wholesale access customers, who compete in the retail market, and therefore ultimately end-users (including higher prices, poorer quality services and less innovation and investment).

8.322 Although our concerns vary according to whether the behaviour is exclusionary or exploitative, both ultimately lead to poorer outcomes for end customers.

8.323 With regards to exclusionary behaviour, our competition concerns are:

a) BT has the incentive and ability to refuse to supply access and thus restrict competition in the provision of products and services in the relevant downstream markets.

b) BT could set excessive wholesale charges for WLA, LL Access or IEC services or engage in margin squeeze behaviour.

c) BT could provide access on less favourable terms compared to those obtained by its own downstream businesses.

d) BT could target discounts or price reductions in order to deter the rollout of new networks by competitors. These could take a number of forms – for example BT could adjust its wholesale prices in geographic areas subject to competitive rollout of new networks, or it could offer other forms of pricing with a loyalty inducing effect. By offering low prices initially, BT could discourage competing network build.

8.324 With regard to exploitative behaviour, our competition concerns are:

a) Where there is no specific charge control, BT could set excessively high prices, or charges that, in combination with downstream prices, amount to a price squeeze, so as to have adverse consequences for end-users of public electronic communications services (also referred to as "margin squeeze").

b) BT may not have sufficient incentives to continuously deliver an adequate level of service quality in relation to network access.

8.325 A number of stakeholders agreed with our competition concerns:

a) Three argued that BT has an incentive to discriminate in favour of its downstream arm EE and that the supply of dark fibre by CityFibre and Virgin Media protects Three from that incentive.[893]

b) Vodafone commented that BT could design commercial offers, including scale volume discounts which in practice discriminate against smaller ISPs.[894]

c) [✂] commented that BT could leverage its dominance in WLA services by creating contracts which new fibre providers cannot replicate.[895]

d) [✂].[896]

8.326 Compass Lexecon (in a report for BT Group) argued that we have not sufficiently illustrated our competition concerns, in particular that BT has the incentive or ability to:[897]

a) leverage its position from less competitive areas into Virgin Media areas by pricing SBB/SFBB below cost, because telecoms providers can already access these at competitive prices, and Virgin Media's assets are sunk; and

b) margin squeeze in Virgin Media areas.

8.327 Similarly, BT Group argued that there is no evidence of BT engaging in unfair pricing practices (or the risk of them).[898]

8.328 We discuss our concerns in relation to geographic pricing in Volume 3, Section 7 – where we set out our concerns primarily relate to new network build. In relation to margin squeeze, we recognise that if BT implemented a margin squeeze strategy in Area 2, some proportion of customers that are lost by retail competitors may not be gained by BT but instead lost to the Virgin Media network. However, in general, given our SMP finding, margin squeeze remains a competition concern absent regulation. We set out our specific margin squeeze concerns in Volumes 3 and 4.

8.329 BT Group commented that in the absence of market power, our theories of harm are unlikely to materialise.[899] In particular it commented that in ultrafast, where it considers BT does not have market power, there is no case to impose specific restrictions on BT. It also commented that our reasoning notably excludes any comparison between BT and Virgin Media. As we have found BT to have SMP in a product market defined on the basis of all speeds, we have considered our competition concerns on that basis, and found that they

[893] Three response to January 2020 Consultation, paragraph 3.38.
[894] Vodafone response to January 2020 Consultation, Part 1 paragraph 5.3.
[895] [✂] response to January 2020 Consultation, [✂].
[896] [✂] response to January 2020 Consultation, [✂].
[897] Compass Lexecon, 2020. *Review of Ofcom's approach to assessing ultrafast market power* (Compass Lexecon report), paragraphs 5.18- 5.21.
[898] BT Group response to January 2020 Consultation, paragraph 1.27.
[899] BT Group response to January 2020 Consultation, Part A, paragraphs 5.1-5.8.

are likely to materialise as outlined above. We do not consider a comparison of BT and Virgin Media relevant in this context.

8.330 Openreach commented that our concerns were unspecific and generalised.[900] In particular, Openreach argued that we should identify a competition concern associated with each form of access i.e. FTTC, FTTP and LL Access, and whether a competition concern is associated with new entrants only or also established rivals. As most of Openreach's concerns appear to relate to our proposals on geographic discounts, we have addressed these points in more detail in Volume 3, Section 7.

8.331 Inter-exchange connectivity services are necessary to enable our access regulation to work. If BT has SMP in certain links between BT exchanges, and these were to remain unregulated, this could undermine our access remedies by leaving a regulatory gap between access and competitive backhaul provision.

8.332 In summary we consider that BT's SMP in the markets discussed above could lead to adverse effects for consumers, namely a lack of choice of services and weaker incentives for BT (and other providers) to invest and innovate in new technologies including full-fibre, which would make it less likely that consumers would realise the benefits of network competition.

8.333 We discuss our proposed remedies to address these competition concerns in Volume 3.

[900] Openreach response to January 2020 Consultation, paragraphs 4.3, 4.21, 7.83.

9. Wholesale Fixed Analogue Exchange Lines and Wholesale ISDN exchange lines

Market definition and three criteria test – WFAEL

9.1 This section describes the product and geographic markets in relation to Wholesale Fixed Analogue Exchange Lines (WFAEL) and considers whether the three criteria set out in subsection 79(2B) of the Act are met in relation to that market.[901]

9.2 WFAEL is a narrowband access connection between a customer's premises and a local exchange. Access connections included in the WFAEL market are used to provide voice calls.[902]

9.3 In our January 2020 Consultation, we proposed to apply the three criteria test set out in the 2014 EC Recommendation to a market consisting of voice services over WLR, MPF, Cable, FTTP with an analogue telephone adaptor (ATA) and IP-based fixed voice services in the UK excluding the Hull Area. To undertake this assessment, we reviewed market developments that were likely to occur over the forthcoming review period and then considered whether the market definition that we defined as part of our 2017 NMR remained an appropriate frame of reference.

9.4 We proposed that, in large part due to the switch-off of BT's TDM network (including withdrawal of WLR from 2023) and the transition to IP-based fixed voice services, the three criteria test would no longer be met in relation to WFAEL and this market would therefore not be suitable for *ex ante* regulation.

9.5 Having reviewed stakeholder responses, we have decided that the three criteria test set out in subsection 79(2B) of the Act is not met and accordingly Ofcom may not identify WFAEL as a market for the purpose of considering whether to make or review a market power determination. Consequently, we have decided to remove all SMP regulation from BT in the supply of WFAEL in the UK excluding the Hull Area.

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[901] Since the publication of our January 2020 consultation, the UK has left the EU and the subsequent transition period ended on 31 December 2020. Although as a result of this Ofcom is no longer required to take utmost account of the 2020 EC Recommendation (which supersedes the 2014 EC Recommendation), including the three criteria test, it is nonetheless required to consider whether the three criteria set out in subsection 79(2B) of the Act are met. Where Ofcom does not consider that the three criteria are met, it may not identify a market for the purposes of making a market power determination. In assessing the application of the three criteria set out in subsection 79(2B), we may also have regard to various recommendations or guidelines published by the European Commission, and guidelines published by BEREC, including the 2020 EC Recommendation. The three criteria set out in subsection 79(2B) of the Act are the same in substance as those set out in the 2020 EC Recommendation.

[902] A WFAEL service comprises a physical access line in addition to the technical capability to carry voice calls over the Public Switched Telephone Network. In addition to WFAEL, to provide voice calls retailers of fixed landline services will also require Wholesale Call Origination (WCO) and Wholesale Call Termination (WCT). These services are considered as part of the Wholesale Voice Markets Review 2021–26.

Stakeholder responses

9.6 BU-UK, CityFibre, Cumbria County Council, Gigaclear, KCOM, Openreach and two confidential respondents supported our proposals that the WFAEL market should not be subject to *ex ante* regulation.[903] Openreach reiterated its voluntary commitment in respect of WLR (see below).

9.7 [✂] said that we should maintain transitory access regulation in relation to WFAEL. They argued that this was necessary due to:

- BT's continued SMP in the WFAEL market;
- the large number of consumers still using WLR towards the start of the review period;
- the potential for WLR price increases in the absence of a charge control;
- the limited potential for purchasers of WLR to switch to alternative wholesale services; and;
- complexities in migration to VOIP which can impede the options for migration.[904]

9.8 [✂] said that they need WLR to serve smaller business sites of multisite customers. They also argued that voluntary commitments from Openreach are not enough to guarantee a competitive market during the transition period and that the removal of regulation would reduce consumer choice of fixed telephony.

9.9 The Advisory Committee for Northern Ireland (ACNI) recognised that WFAEL is a declining product set and in a significant transition phase and acknowledged our view that these products do not fulfil the three criteria test. They also said that Ofcom should monitor BT's voluntary commitment in relation to WLR and ISDN2/30.[905]

9.10 FCS said that transitional pricing arrangements for BT wholesale product variants designed to support a voice-only service (equivalent to current WLR plus voice pricing) should be maintained beyond the withdrawal period. They said that prices should be below the "anchor" pricing proposed for 40:10 products (e.g. the new 0.5:0.5 product).[906]

9.11 ITSPA said that proposing deregulation of fixed-line telephony without a proper analysis of the consequences for voiceband data (VBD) services or any regard to our obligations to ensure facsimile is a material oversight. ITSPA noted a number of uses of voiceband data services (some of which may use WLR currently) and argued that VBD applications remain a critical part of the UK's infrastructure.[907]

9.12 Vodafone and UKCTA noted the importance of WLR as a "copper bearer" to carry broadband services. Vodafone considered that Ofcom should continue to regulate WLR and retain price alignment with MPF. As these arguments relate to the provision of

[903] BU-UK question 9.1; CityFibre, paragraph 3.175; Cumbria County Council, question 9.1; Gigaclear, paragraph 74; KCOM, paragraph 2.1; Openreach, paragraphs 5.29-5.32; [✂], question 9.1; [✂], question 9.1; in their responses to the January 2020 Consultation.
[904] [✂] response to January 2020 Consultation, Q9.1.
[905] ACNI response to January 2020 Consultation, page 2.
[906] FCS response to January 2020 Consultation, page 2.
[907] ITSPA response to January 2020 Consultation.

broadband, and not the provision of fixed voice services, we address them in Volume 3, Section 5. Vodafone said that Openreach's voluntary commitments in respect of WLR offered nothing in addition to BT's obligations under competition law, offering little assurance to retailers reliant on WLR.[908]

Developments in the WFAEL market

9.13 There are a number of ways in which communications providers can offer voice calls over a landline, and consequently there are several providers of WFAEL in the UK. Openreach supplies WFAEL services over BT's TDM network using its Wholesale Line Rental (WLR) product. WLR is used by BT and other telecoms providers to provide voice services to end users.[909] Sky and TalkTalk use their LLU networks[910] to provide fixed voice services to end users and Virgin Media provides fixed voice services using its cable network.

9.14 In our 2017 NMR Statement, we found that BT had a 54% share of WFAEL connections and that some telecoms providers continued to rely on Openreach's WLR service to provide a landline service.[911] We found that WLR was particularly important in the supply of lines to some customer groups, namely fixed voice-only residential consumers, those outside the footprint of competing networks, and businesses using analogue lines. In our 2017 NMR Statement we therefore found that BT continued to hold SMP in the WFAEL market in the UK excluding the Hull Area.

9.15 Since the 2017 NMR Statement, Openreach has confirmed plans to withdraw its WLR products and transition to IP voice services.[912] Openreach has said it will discontinue WLR by the end of 2025, when it switches off its dedicated analogue telephone network (its Time Division Multiplexing (TDM) network).

9.16 The withdrawal of WLR means that providers that currently rely on WLR will now need a different access product. In addition, since the TDM network is being switched off, the new product will need to use IP technology to deliver voice calls.

9.17 Alternatives to WLR for access, to carry an IP based voice service, are already available.

a) Where a voice landline is provided alongside a broadband service, providers can use SOGEA to carry both broadband and an IP based voice service.

[908] Vodafone response to the January 2020 Consultation, part 1, paragraph 4.22
[909] BT's Regulatory Financial Statements for 2020 report that there were 14.7 million WLR rentals of which 11.3 million were internal and 3.4 million external. This represents a 7.0% decline on the number of WLR lines compared to the same period in 2017.
[910] Sky and TalkTalk have their own networks but make use of Openreach's network to provide a connection between the local exchange and the end user's premises (WLA). While these LLU networks ultimately rely on upstream inputs from Openreach, for the purposes of our WFAEL market evaluation we assume that regulated access to the WLA inputs is in place, and treat Sky and TalkTalk as independent competitors to Openreach in WFAEL. We consider the WLA market in Sections 6-8.
[911] Ofcom, 2017 NMR Statement, figure 6.1.
[912] See https://www.openreach.co.uk/orpg/home/products/wlrwithdrawal/wlrwithdrawal.do and https://www.bt.com/about/special-services/latest-news/wlr-withdrawal.

b) Where a voice landline is provided on its own (e.g. to customers that don't want broadband), providers will be able to use Openreach's low bandwidth broadband product to carry an IP based voice service.[913]

9.18 SOGEA and the low bandwidth broadband product are available within the Openreach GEA footprint (i.e. where FTTC and/or FTTP are available). Openreach has also developed a transitional copper-based product to provide a fixed voice service with or without a broadband service in areas outside its GEA footprint.[914]

9.19 The broadband access lines, that carry IP voice services, fall within the WLA market. Therefore, after WLR is removed, effective competition in the WLA market will be an important enabler of competition downstream in the provision the access component of WFAEL. We discuss our approach to the regulation of the WLA market in Volume 3, Sections 3 and 5.

9.20 In addition to the underlying access line, providers will also need to be able to provide an IP-based voice service over that line in order to replace the voice capability currently provided by WLR. Openreach has stated that it does not intend to provide a VOIP service following TDM switch off.[915] Providers will therefore need to develop their own VOIP service or purchase a service from another supplier.

9.21 We expect the widespread launch of IP-based voice services by a range of providers at both the wholesale and retail levels over the course of this review period. These IP-based voice services are likely to provide near identical or improved voice quality for consumers relative to services currently provided over the analogue telephone network.

9.22 Over the period of the review we will see the steady migration of existing WLR lines to IP-based voice, as well as the termination of new supply of WLR services. By the end of the review period we do not expect WLR services to remain in operation, except potentially in a few specific cases.

Market definition

Product market

9.23 In previous reviews, we have found that the number of landlines for voice calls has remained relatively stable despite significant increases in retail line rental prices and falling call volumes. End users have not been willing, in the past, to give up their voice landline and substitute to mobile only or other alternatives, in part because for many of them this

[913] We do not consider we need to underpin this commitment with a specific access obligation. We discuss this question in Section 5 of Volume 3.
[914] SOTAP (openreach.co.uk)
[915] See https://www.openreach.co.uk/orpg/home/updates/briefings/generalbriefings/generalbriefingsarticles/gen04819.do (account required).

would mean giving up their broadband service.[916] Consequently, we have defined product markets that include the main fixed access technologies (copper lines, cable lines and voice-enabled fibre lines).

9.24 The number of fixed voice lines is currently stable, at around 29.1m lines between 2015 and 2019. During this review period, however, we expect the withdrawal of WLR-based fixed voice services, which will change the way that many end users receive voice services at a fixed location.

9.25 We expect that Openreach's TDM switch-off and the move to IP will increase the number of broadband-only packages available to end users, as the provision of broadband services will no longer include the provision of a fixed voice access line by default. The widespread availability of broadband only packages may lead more end users to give up their analogue fixed line and rely on their mobiles for voice calls, although it is difficult to predict in advance precisely how substitution patterns will be affected.

9.26 We expect the widespread launch of IP-based voice services during the review period and in particular we expect that providers that currently use WLR to supply end users with a fixed voice service will need to replace that service with an IP-based voice service and migrate their existing customers onto it. These new services will provide near identical or improved voice quality when compared to an analogue voice service and the impact of migration on existing users should be minimal. We expect that IP-based voice will provide an effective substitute for analogue voice services provided via MPF, cable or voice enabled fibre.

9.27 We have not repeated the detailed assessment of the direct and indirect constraints that we undertook in the 2017 NMR Statement and previous reviews of the WFAEL market. As a point of reference for undertaking the three criteria test, we have decided to consider whether a product market including IP-based voice services as well as those services included in our 2017 market definition meets the three criteria test and should be subject to *ex ante* regulation.[917]

9.28 This means that that voice services over WLR, MPF, cable, voice enabled fibre and IP-based voice services at a fixed location are included in the relevant frame of reference.

Geographic market

9.29 In the 2017 NMR Statement, we defined a geographic market that comprised the UK excluding the Hull Area. As part of that assessment, we noted that, at the retail level, the Universal Service Conditions (USC)[918] require the designated provider (BT in the UK excluding the Hull Area) to provide retail telephony services that are priced uniformly,

[916] Where providers use LLU to supply broadband services, the MPF product will include both a broadband and a voice facility. Similarly, where providers use SMPF or GEA to supply broadband services they need a copper bearer in the form of an MPF or WLR line (which will include a voice facility) in order for the broadband service to function. Consequently, the majority of the products available in the retail market for broadband are either dual or triple play products.
[917] We note that, where a narrower product market does not pass the three criteria test, a wider product market definition that included alternative services would also not pass the three criteria test.
[918] Further information is available on the Ofcom website. Ofcom also conducted a review in 2006.

irrespective of geographic location. We also proposed a geographic market that comprised the UK excluding the Hull Area in our consultation.

9.30 No stakeholders commented on our proposed geographic market definition. The USC remains in place and we have seen no evidence to suggest that a different geographic market would be appropriate for the 2021 to 2026 review period. We therefore consider that a single market for WFAEL in the UK excluding the Hull Area remains an appropriate frame of reference to consider the three criteria test.

Three criteria test for WFAEL

9.31 As discussed in Annex 1, in determining whether to identify a market for the purpose of making a market power determination, we must consider whether the three criteria set out in subsection 79(2B) of the Act are met. Where we do not consider that the three criteria are met, we may not identify a market for this purpose.

9.32 In identifying a market, we may have regard to various recommendations or guidelines published by the European Commission, and guidelines published by BEREC, including the 2020 EC Recommendation. The WFAEL market is not listed in the 2020 EC Recommendation as a market in which *ex ante* regulation may be warranted. [919] In the 2017 NMR Statement, we considered the three criteria test for WFAEL and found that these three criteria were satisfied. As part of this review, we have assessed whether this continues to be the case for the criteria set out in subsection 79(2B) of the Act.

9.33 We have also had regard to our statutory duties, which include an obligation to carry out our functions with a view to securing that regulation does not involve the imposition or maintenance of regulatory burdens that are unnecessary.[920]

Presence of high and non-transitory barriers to entry

9.34 In the 2017 NMR Statement we considered the following factors relevant to our assessment of the first criterion, including: [921]

- the historical reliance by telecoms providers on WLR (in combination with Wholesale Call Origination) to supply voice services to certain groups of interest (e.g. business, fixed voice-only, off-net) which suggests it has not been cost effective or otherwise commercially effective to use MPF or cable to supply these segments; and
- although there may have been scope for rivals to provide a stronger competitive alternative for these customer groups, substitution of this type was not of sufficient likelihood and scale to eliminate the high barriers to entry.

[919] Note, retail access to the public telephone network at a fixed location for residential and non-residential customers was previously identified as a market susceptible to *ex ante* regulation in the 2007 EC Recommendation but not in the 2014 EC Recommendation.
[920] Section 6 of the Act.
[921] We note that point 11 of the 2014 EC Recommendation says that the "main indicators to be considered when assessing the first and second criteria are similar to those examined as part of a forward-looking market analysis to determine the presence of significant market power".

9.35 Technical change, in particular the closure of BT's TDM network and the removal of WLR will result in new methods of supply (i.e. IP-based voice) for providers offering voice services to end users. All providers of voice services that currently use WLR (including BT) will need to transition to these alternative methods of supply over the review period.

9.36 These new methods have lower barriers to entry than the previous TDM network. As set out above, the competitive provision of the underlying access services (to broadband and/ voice services) is ensured by our regulation of the WLA market as set out in Sections 6 and 7. We expect a range of providers will develop IP-based voice services during the review period. Consequently, alternative providers of fixed voice services are unlikely to face high and non-transitory barriers to entry in the supply of WFAEL in the UK excluding the Hull Area by the end of the period of this review.

Market structure tending toward competition

9.37 We expect a rapid decline in the number of WLR lines over the review period as BT's TDM network is switched off and WLR is discontinued. Openreach has announced that it will not be developing a managed VOIP product following the withdrawal of WLR. The services that will replace those provided over WLR will be supplied by other providers and we expect significant growth in the use of IP-based voice services as consumers who value voice services at a fixed location are migrated to all-IP services. The market for WFAEL will, therefore, tend towards effective competition over the review period.

9.38 Effective competition in the supply of broadband access will be an important enabler of this change and broadband access will be enabled either through continued *ex ante* regulation of the broadband access market to the extent that this remains appropriate or competitive provision to the extent that this market might be found to be competitive in the future.

The insufficiency of competition law alone to adequately address the market failure(s) concerned

9.39 The three criteria are cumulative: all three criteria need to be satisfied for a market to be identified for the purposes of making or reviewing a market power determination. Given that the first two criteria are not met we have not considered this criterion further.

Conclusion to market analysis

9.40 Given that we have found that the market for WFAEL in the UK excluding the Hull Area does not meet two of the three criteria set out in subsection 79(2B) of the Act, Ofcom may not identify it as a market for the purpose of considering whether to make or review a market power determination. Consequently, we have decided to remove all regulation from the WFAEL market in the UK excluding the Hull Area.

9.41 That said, fixed landline services remain an important product for end users and there will be a period of transition over the course of the review period. We discuss this further below.

Transitional arrangements

9.42 We have considered whether transitional regulation is required to support Openreach's customers that will continue to be supplied using WLR during at least part of the market review period. As we discussed in our consultation, Openreach has the following voluntary commitments:

- continue to provide new WLR and ISDN2/ISDN30 circuits until December 2023;
- continue to support the existing WLR and ISDN2/30 customer base (including any new circuits provided up to December 2023) on a reasonable basis until December 2025;
- continue to provide network access with respect to the WLR and ISDN2/30 products on fair and reasonable terms; not unduly discriminate; supply on Equivalence of Input (EoI) terms; maintain published reference offers; and notify changes to terms and conditions on the same basis as previously for these products;
- price these products on a 'fair and reasonable' basis until withdrawal i.e. on wholesale terms that do not distort downstream competition by squeezing margins; and
- maintain a good level of quality of service for these products until withdrawal and will continue to provide Ofcom with monthly KPI reports (and publish KPI reports on a quarterly basis if required).[922]

9.43 We agree with ACNI that it will be important for BT to comply with these commitments so that providers that are temporarily reliant on WLR can continue to compete effectively while they are moving to IP based voice.

9.44 We disagree with [✂] that we should impose transitional provisions for WFAEL. Openreach's voluntary commitment ensures that providers will be able to continue to purchase new WLR lines/use existing WLR lines until their withdrawal in 2023/2025 respectively, and that the prices for WLR during this period will be fair and reasonable and will not impose a margin squeeze. We do not consider additional obligations as some stakeholders such as Vodafone argue for (whether required by Ofcom or self-imposed through a more extensive voluntary commitment) are necessary to protect competition as providers switch from WLR to modern alternatives. Further, additional provisions would dampen the incentive on telecoms providers to prepare for the withdrawal of WLR from 2023.

9.45 Additionally, since around 75% of Openreach's WLR lines are internal, we believe that BT has a strong incentive to ensure an orderly transition from analogue to IP-based services. We therefore believe that Openreach's commitment will ensure the availability of WLR-based services to competitors to BT until they are phased out as part of TDM switch-off.

9.46 In response to ITSPA's comments on the potential impact of WLR deregulation on certain voiceband data services, as set out in our statement on the future of fixed telephone services[923], we recognise that the migration to IP is necessary to ensure the continued provision of reliable landline telephone services given that BTs TDM network will not be

[922] WLR and ISDN2/30 voluntary commitment
[923] Ofcom, 2019. The future of fixed telephone services, Policy positioning statement, 22 February 2019,

available in the long term. In that statement, we noted that downstream service providers that offer services that rely on some of the technical characteristics of TDM networks will need to test their equipment to see if it will continue to function over IP and then replace, upgrade or reconfigure it as appropriate. They also need to make sure that their customers (which range from residential users to large commercial and public sector entities) are aware of the issue and take any necessary steps to maintain their service(s).

9.47 Openreach has developed a low bandwidth broadband product to support existing voice-only and similar low bandwidth applications within its GEA footprint (FTTC and FTTP).[924] This will support the migration to IP for those premises that wish to retain a fixed voice service that do not otherwise wish to receive a broadband service.

9.48 As set out above, and in response to FCS' comments, we note that Openreach is currently selling its low bandwidth broadband product to communications providers at the same price as the WLR service. This product is a regulated form of access falling within the WLA market, and as such it is required to be supplied on an EOI basis.

9.49 Openreach's low bandwidth fibre products are 500 kbit/s symmetric which should enable telecoms providers to offer high quality voice calls and key features like three-way calling. This product was launched for FTTP and SOGEA on 23 March 2020.

9.50 More broadly, Ofcom and the industry are considering the implications for end users of the transition of fixed voice services to IP as part of the Future of Voice Services project.[925]

Market definition and three criteria test – ISDN2 and ISDN30

9.51 This sub-section describes the product and geographic markets in relation to ISDN2 and ISDN30 and applies the three criteria test to these markets.

9.52 In our January 2020 Consultation, we proposed to apply the three criteria test set out in the 2014 EC Recommendation to a market consisting of ISDN2 services and another market consisting of ISDN30 services. To undertake this assessment, we reviewed market developments that were likely to occur over the forthcoming review period and then considered whether the market definition that we defined as part of our 2017 NMR remained an appropriate frame of reference.

9.53 We have decided that the three criteria test set out in subsection 79(2B) of the Act is not met and accordingly that each of the ISDN2 market and the ISDN30 market may not be identified as a market for the purpose of considering whether to make or review a market power determination. Consequently, we have decided to remove existing regulation from each market in the UK excluding the Hull Area.

[924] Openreach price list (GEA-FTTP); Openreach price list (SOGEA and SOGfast) [accessed 10 March 2021]
[925] See for example The Future of Voice Services, Ofcom February 2019.

Stakeholder responses

9.54 BU-UK, CityFibre, Cumbria County Council, Gigaclear, KCOM, Openreach and two confidential respondents supported our proposal that ISDN2 and ISDN30 should not be subject to *ex ante* regulation.[926]

9.55 Openreach has made a voluntary commitment in relation to ISDN2 and ISDN30 services on the same terms as it has committed to for WLR (see paragraph 9.42 above).

9.56 [✂] said that there is a need to maintain transitory regulation in relation to ISDN2 and ISDN30 products because BT will continue to have SMP in the provision of ISDN services.[927]

9.57 ACNI said that while ISDN2 and particularly ISDN30 are declining products, they may still be used by significant SMEs in Northern Ireland who do not have the financial capacity for forced technology change. They also said Ofcom should monitor BT's voluntary commitment in relation to WLR and ISDN2/30.[928]

9.58 Vodafone said that there remains a rump of business customers on ISDN services and it is important their interests are safeguarded in the period ahead of transition. It said that a key focus must be on finding a sensible approach to aid the transition away from existing ISDN connections, and it may well be the least disruptive course of action for ISDN users to migrate to FTTP once it becomes available.

9.59 Vodafone said that transitionary pricing safeguards should be put in place for existing ISDN users waiting to move to FTTP that wish to avoid any intermediate steps, to prevent punitive price rises. Vodafone proposed a pricing safeguard cap of no more than 4% annually until 2025, either in the form of a voluntary commitment or, if necessary, through formal measures.[929]

Developments in the ISDN market

9.60 ISDN2 and ISDN30 are narrowband access services, most commonly used by businesses to provide multiple lines for calls. ISDN2 services are appropriate for business sites requiring fewer than eight voice channels, whereas ISDN30 services are more appropriate when a larger number of channels is required.

9.61 Volumes for both ISDN2 and ISDN30 have been declining over time as end users migrate to more modern services, primarily IP-based services. There has been a further decline in ISDN2 and ISDN30 lines since our 2017 NMR Statement and volumes are expected to decline further over the forthcoming review period.[930] This pattern reflects ISDN's legacy

[926] BU-UK question 9.1; CityFibre, paragraph 3.175; Cumbria County Council, question 9.1; Gigaclear, paragraph 74; KCOM, paragraph 2.1; Openreach, paragraphs 5.29-5.32; [✂], question 9.1; [✂], question 9.1; in their responses to the January 2020 Consultation.
[927] We set out [✂]'s response in more detail earlier in this section – see paragraphs 9.7-9.8.
[928] ACNI response to January 2020 Consultation, page 2.
[929] Vodafone response part 1 3.16 etc.
[930] BT's RFS shows that, between the year ended 31/03/2017 and the year ended 31/03/2020, the number of ISDN2 channels fell from 867,517 to 502,699 (a decline of 42%). Over the same period the number of ISDN30 channels fell from

position. Businesses purchasing new multiple lines have long had good IP alternatives available to them. However, those that have installed systems that use ISDN face switching costs when moving to newer and better alternatives, hence the process of transition over time.

9.62 In our 2017 NMR Statement, we found that each of ISDN2 and ISDN30 were in separate product markets. We also imposed a charge control in relation to existing ISDN2 and ISDN30 circuits but did not impose a control on new ISDN2 or ISDN30 lines.

9.63 In our January 2020 Consultation, we proposed that the ISDN2 and ISDN30 markets did not meet two of the three criteria in the three criteria test, and we did not consider that it was appropriate to impose *ex ante* regulation in the supply of ISDN2 and ISDN30 services. We also did not consider that it was appropriate to impose transitional regulation in relation to these services.

9.64 As noted above, Openreach has consulted on its plans to withdraw its TDM network, which supports WLR services[931] and ISDN, by the end of 2025 (i.e. before the end of this review period). End users who currently take ISDN services will therefore have to migrate to IP-based services, by the end of the review period.

Product market

9.65 In our 2017 NMR Statement, we did not find IP-based services to be in the same market as ISDN2 or ISDN30 services. We found that the lack of substitution from ISDN to IP-based services in response to a SSNIP was in large part due to the high migration costs that many firms would face in moving from ISDN services to more modern alternatives.

9.66 In previous reviews, businesses purchasing ISDN lines had the option to delay their switch to IP-based services for several years. Following Openreach's plans to switch off its TDM network by the end of the forthcoming review period, this will no longer be an option for these customers, as Openreach will no longer be supplying services that have been regulated under the ISDN2 and ISDN30 market reviews. Access to the broadband lines that enable the provision of IP-based services (i.e. the closest substitutes to ISDN services) will continue to be regulated.

9.67 It is possible that the notification of withdrawal of ISDN may prompt current customers of ISDN to switch to IP-based alternatives where they would not have before. However, the extent and pace of this change is unclear at this stage. Given this, we have not repeated the detailed assessment of competitive constraints that we undertook in the 2017 NMR Statement and previous reviews of the ISDN2 and ISDN30 markets. Rather, we consider

1,413,086 to 797,398 (a decline of 44%). The percentage decrease in ISDN30 channels may not be equivalent to the percentage decrease in lines as the number of channels used per ISDN30 line may have changed over time.

[931] The impacted products, collectively referred to as Wholesale Line Rental in this consultation, are: WLR3 analogue; ISDN 2; ISDN 30; LLU SMPF; SLU SMPF; Narrowband Line Share and Classic.

whether the separate ISDN2 and ISDN30 markets as defined in the 2017 NMR Statement each still meet the three criteria test and should be subject to *ex ante* regulation.[932]

Geographic market

9.68 In 2017, we noted that BT's wholesale prices for ISDN2 and ISDN30 were uniform across the UK excluding the Hull Area and, given that competitors tend to price relative to BT, this suggested national pricing outside of the Hull Area. We therefore defined the geographic markets for ISDN2 and ISDN30 as the UK excluding the Hull Area.

9.69 We consider that the geographic market as defined in the 2017 NMR Statement is an appropriate frame of reference to consider whether each of ISDN2 and ISDN30 still meet the three criteria test and should be subject to *ex ante* regulation.

Three criteria test for ISDN2 and ISDN30

9.70 As discussed in Annex 1, in determining whether to identify a market for the purpose of making a market power determination, we must consider whether the three criteria set out in in subsection 79(2B) of the Act are met. Where we do not consider that the three criteria are met, we may not identify a market for this purpose.

9.71 In identifying a market, we may have regard to various recommendations or guidelines published by the European Commission, and guidelines published by BEREC, including the 2020 EC Recommendation.

9.72 The ISDN2 and ISDN30 markets are not listed in the 2020 EC Recommendation as markets in which *ex ante* regulation may be warranted.[933] In the 2017 NMR Statement, we considered the three criteria test for each of the ISDN markets and found that these three criteria were satisfied in relation to each of them. As part of this review, we have assessed whether this continues to be the case for the criteria set out in subsection 79(2B) of the Act.

9.73 We have also had regard to our statutory duties, which include an obligation to carry out our functions with a view to securing that regulation does not involve the imposition or maintenance of regulatory burdens that are unnecessary.[934]

Presence of high and non-transitory barriers to entry

9.74 As in our 2017 NMR Statement, we consider that barriers to entry and expansion in each of the ISDN2 and ISDN30 markets are high due to the large sunk costs that would need to be incurred to establish the infrastructure required to provide an ISDN30 exchange line, and the fact that these costs would need to be recovered in a declining market. The number of

[932] We note that, where a narrower product market does not pass the three criteria test, a wider product market definition that included alternative services would also not pass the three criteria test.
[933] Note, retail access to the public telephone network at a fixed location for residential and non-residential customers was previously identified as a market susceptible to *ex ante* regulation in the 2007 EC Recommendation but not in the 2014 or 2020 EC Recommendation.
[934] Section 6 of the Act.

ISDN2 and ISDN 30 lines has continued to decline and we do not expect new entry into the supply of ISDN lines over the review period.

9.75 For these reasons, we have decided that barriers to entry into each of the ISDN2 and ISDN30 markets are likely to remain high and non-transitory over the period of this review in the UK excluding the Hull Area.

A market structure that does not tend towards effective competition

9.76 As noted above, the number of ISDN2 and ISDN30 lines has continued to decline since the time of our 2017 NMR Statement.

9.77 With Openreach's TDM network scheduled for switch off, ISDN services are not sustainable in the longer term and we do not expect significant new demand for ISDN lines. Modern alternatives already exist in the form of IP-based services, which are provided by a variety of telecoms providers. The underlying broadband access lines which carry IP-based services will continue to be regulated over the review period and so we expect competition to persist in IP-based services.

9.78 We expect that all of the remaining ISDN2 and ISDN30 volumes will migrate towards IP-based services over the review period. As this migration progresses and the number of end users using IP-based services increases, the market will tend towards effective competition.

Competition law alone would not adequately address the market failure(s)

9.79 In previous reviews of ISDN2 and ISDN30 we have concluded that competition law alone would not have adequately addressed the market failures identified because the speed of an intervention based solely on competition law was not sufficient and because competition law did not provide sufficient certainty for telecoms providers.

9.80 As set out above, ISDN2 and ISDN30 has continued to decline, these markets are now in transition and all customers will need to migrate to more modern alternatives over this review period. Consequently we no longer see a need to provide for more rapid intervention or to provide additional certainty, beyond what competition law already provides. Moreover, pricing regulation for ISDN2 or ISDN30 would dampen the incentive on telecoms providers to prepare for the withdrawal of ISDN2 and ISDN30 from 2023.

9.81 We, therefore, consider that, during this period of transition to IP-based services in the context of the markets for ISDN2 services and for ISDN30 services competition law will be adequate as a means of addressing the market failure identified and, therefore, these markets do not meet the third criteria of the three criteria test.

Conclusion to market analysis

9.82 Given that we have found that the markets for ISDN2 and ISDN30 in the UK excluding the Hull Area do not meet two of the three criteria set out in subsection 79(2B) of the Act, Ofcom may not identify them as markets for the purpose of considering whether to make

or review a market power determination. Consequently, we have decided to remove existing regulation from each market in the UK excluding the Hull Area.

9.83 We also do not consider that it is necessary to impose transitional arrangements in relation to these services. We set out our reasons for this below.

Transitional arrangements

9.84 We have signalled our progressive withdrawal of regulation in these markets over the last few market reviews, with the most recent 2017 Narrowband Market Review continuing regulation to existing lines only, as we considered that there were suitable IP-based alternatives in the market for new lines.

9.85 Given the nature of the end consumers of these products (medium to large businesses), the availability of suitable IP alternatives and the need for all consumers to plan a migration to such alternatives, we have decided that transitional arrangements are not necessary or appropriate for this market.

9.86 In response to [✂]'s comments, we disagree that there is a need for transitional regulation for ISDN services. We believe that Openreach's voluntary commitment, set out above, should provide additional assurance in relation to the supply and pricing of ISDN services until the closure of the TDM network in 2025.

9.87 In response to Vodafone's comments, we recognise that some ISDN users may prefer to wait and migrate directly to FTTP services, where they expect FTTP will be made available before ISDN is discontinued. This is a commercial choice for those customers, and we note that they will retain the option of switching to an IP service in the meantime. Given the small and declining number of ISDN users, we believe the number of end users in this situation is likely to be small. In any case, we believe that Openreach's voluntary commitment to fair and reasonable ISDN pricing over the review period will provide adequate protection in that it will limit the size of any price increase.

10. Wholesale Broadband Access

Market definition and three criteria test – WBA

10.1 This section considers the product and geographic market definition in relation to Wholesale Broadband Access (WBA) and considers whether the three criteria set out in subsection 79(2B) of the Act are met in relation to this market.

10.2 In our January 2020 Consultation, our approach to the assessment of WBA was to, first, review market developments that are likely to occur over the forthcoming review period and, second, consider whether the market definition that we defined as part of our 2018 WBA Statement remains an appropriate frame of reference to consider the three criteria test.

10.3 In that consultation, we proposed that the three criteria test set out in the 2014 EC Recommendation is no longer met in relation to WBA and this market is therefore not suitable for *ex ante* regulation.

10.4 Having reviewed stakeholder responses, we have decided that the three criteria test set out in subsection 79(2B) of the Act is not met, and, accordingly, Ofcom may not identify WBA as a market for the purpose of considering whether to make or review a market power determination. Consequently, we have decided to remove existing regulation from WBA Market A.

Background

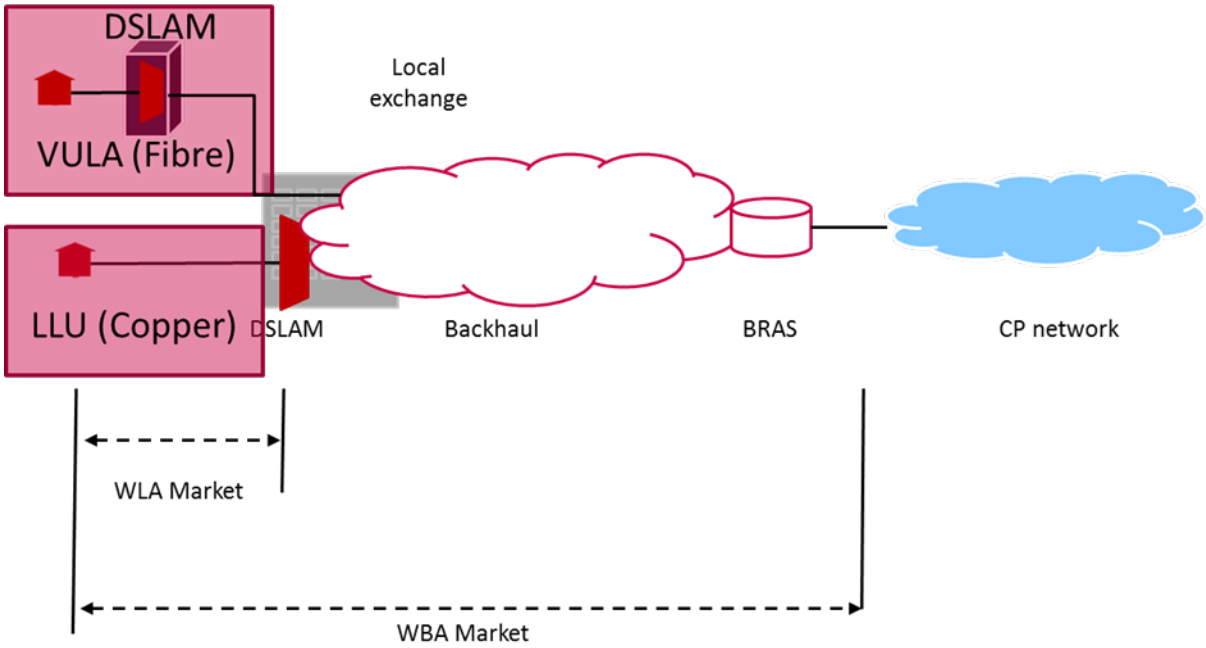
10.5 WBA is a wholesale service that allows telecoms providers to offer a broadband service to retail customers without the provider needing to have or use their own backhaul network.

10.6 In addition to the access connection between the customer's premises and the local exchange that is included in the WLA market, the WBA market includes broadband equipment in the local exchange plus use of BT's core network and associated broadband management services.

10.7 WBA sits between retail broadband services, i.e. the services that end consumers buy, and the WLA market, which relates to the physical connections to consumers' premises.

10.8 WBA services can be provided using both copper and fibre access networks. These are shown in Figure 10.1 below.

Figure 10.1: WLA and WBA services using current generation copper access and next generation networks



10.9 Historically, BT's WBA products, supported by the regulation we have put in place in previous WBA market reviews, played an important role in enabling telecoms providers to offer broadband services without having to invest in their own equipment. In some cases, this was with the intention of building a customer base prior to investing (for example by putting equipment in BT's exchanges to facilitate LLU or VULA).

10.10 However, the use of WBA products by telecoms providers other than BT has fallen steadily and significantly over the last decade. Larger telecoms providers have invested in their own equipment and unbundled BT's exchanges in many areas of the UK. These providers now use LLU and/or VULA to serve the vast majority of UK premises with retail broadband services, and WBA no longer plays a significant role in supporting downstream competition.

10.11 In our 2018 WBA Statement, we defined the relevant product market as wholesale broadband access services provided at a fixed location. For these purposes, wholesale broadband access services comprise the provision of asymmetric broadband access and any backhaul as necessary to allow interconnection with other telecoms providers. This enables "always-on" capability and allows both voice and data services to be used simultaneously.

10.12 We concluded that there were two distinct geographic markets for WBA in the UK excluding the Hull Area (covering 99.4% of premises):

- Market A (0.9% of premises) – areas in the UK where there is limited or no competition based on LLU, VULA or from the Virgin network (exchange areas where there are less than two Principal Operators (PO) in addition to BT[935]); and
- Market B (98.5% of premises) – areas in the UK where there is sufficient competition based on LLU, VULA or from the Virgin network (exchange areas in which there are at least two PO's in addition to BT).

10.13 We found that BT had SMP in WBA in Market A and that no provider had SMP in Market B.

10.14 In our January 2020 Consultation, we proposed that WBA no longer met two of the criteria of the three criteria test, and that it was not appropriate to impose *ex ante* regulation in the supply of WBA in Market A.

Stakeholder responses

10.15 BU-UK, CityFibre, Cumbria County Council, Gigaclear, Vodafone and two confidential respondents agreed with our proposals not to regulate the WBA market in the forthcoming review period.[936]

10.16 Gigaclear said that, given the expected expansion of Openreach's FTTC and FTTP as part of BT's obligations under the broadband USO and state aid programmes to improve broadband speeds in rural areas, it is likely that the size of Market A will reduce. They also said that, with the expected expansion of FTTC and FTTP in Market A areas and the resulting increase in broadband service competition, the barriers to entry into the market will become transitory.

10.17 Similarly, [✂] said that the landscape of the WBA market has changed significantly, noting that as more service providers have unbundled services on Openreach's network, and with Openreach increasing FTTP network footprint, they expect further providers to offer services over the FTTP wholesale network.

10.18 Vodafone agreed that, given the prevalence of GEA usage, it would not be appropriate for Ofcom to continue to regulate WBA as a standalone market, and that it should be absorbed into the wider WLA Market.

10.19 [✂] disagreed with our proposal to remove wholesale pricing controls from the WBA market. They said that some end consumers have no effective choice but to use a standard broadband product supported by WBA or IPStream, and that these end-users continue to face the prospect of being poorly connected for much of the next market review period. [✂] said they could not support the removal of wholesale pricing controls from a market where (in their view) there is clear evidence of market failure, little prospect of infrastructure competition in the next review period, and no compelling evidence that any

[935] We defined principal operators (POs) as operators which we considered were large enough to impose a material competitive constraint on the other operators, across the UK. We designated BT, Sky, TalkTalk, Virgin Media and Vodafone as POs.

[936] BU-UK question 10.1; CityFibre, paragraph 3.175; Cumbria County Council, question 10.1; Gigaclear, paragraph 75; Vodafone, part 1, paragraph 3.14l [✂], question 10.1; [✂], question 10.1; in their responses to the January 2020 Consultation.

of the proposed WLA remedies will provide any real benefit to end-users. They also said that, while they are aware that discussions on the Broadband Universal Service Obligation continue, they may not help end consumers dependent on WBA.[937]

Product market definition

10.20 In our 2018 WBA Statement, we defined the relevant product market as wholesale broadband access services provided at a fixed location. This included broadband access of all speeds provided over copper, fibre and cable to business and residential customers. The market excluded retail broadband services offered over wireless connections (such as satellite services, mobile data services and fixed wireless access) and leased lines.

10.21 We review subsequent developments in Section 6 as part of our assessment of the relevant product market for WLA. This includes a review of the constraints that operate at the retail level which are also relevant for the definition of the product market for WBA. As we set out in that section, in the context of WLA, we conclude that the relevant product market includes broadband access of all speeds provided over a copper, fibre and cable to business and residential customers, and excludes wireless connections and leased lines.

10.22 We therefore consider that the product market definition adopted in our 2018 WBA Statement is an appropriate frame of reference for assessing whether the market for WBA services continues to meet the three criteria test set out in subsection 79(2B) of the Act.

Geographic market definition

10.23 As explained above, we take as a starting point the definition of Market A as in the 2018 WBA Statement. We consider below the extent to which this continues to be an appropriate frame of reference for assessing the three criteria test set out in subsection 79(2B) of the Act in light of changes and prospective changes to competitive conditions in the market.

10.24 In our 2018 WBA Statement, we considered a PO to be present in an exchange area where that PO:

a) had unbundled the local copper exchange and had more than two active lines in that exchange; or

b) was able to serve at least 65% of premises using a cable network; or

c) was able to serve at least 65% of premises using FTTC services (including where the CP had not unbundled the local copper exchange but was able to reach the premises only using fibre-based services).

10.25 We also took into account the potential emergence of additional competition where a PO had committed roll-out based on one of the criteria above even if they were not currently

[937] [✂] response to January 2020 Consultation, question 10.1.

present in that exchange area. We did not take into account FTTP deployment because of the very low take up of FTTP by non-BT POs at that time.

Increases in network coverage

10.26 There has been no further unbundling of exchanges in Market A since our 2018 review. Sky and TalkTalk are present in a small number of the 707 Openreach exchanges in Market A (Sky has unbundled 4 exchanges and TalkTalk has unbundled [✂] 10-30 exchanges). We do not expect that Sky or TalkTalk will unbundle any more copper exchanges during the review period.

10.27 Virgin Media's expansion under Project Lightning has been primarily in areas that are already defined as Market B and we do not expect Virgin Media to build significant amounts of new cable network with the area defined as Market A in 2018.[938]

10.28 We have, however, observed a small increase in the number of premises able to receive a FTTC based broadband service. Since the publication of our 2018 WBA Statement, Openreach has enabled a further 270 cabinets in Market A exchange areas with FTTC. There are now 1,081 GEA-enabled cabinets in Market A.

10.29 Data received from Openreach suggests that they do not plan on enabling a large number of additional cabinets with FTTC, in Market A. This is in part due to an increase in the number of premises where Openreach is planning to roll out FTTP.

10.30 Openreach has committed to commercially (i.e. without public subsidy) build fibre to at least 3.2m premises in Area 3 by 2025/26, as part of its broader ambition to deploy fibre to 20m premises across the UK. Area 3, which we discuss in more detail in Section 7, includes a large proportion of the premises that are within Market A.

10.31 We expect further expansion of Openreach's FTTP coverage over this review period as part of BT's obligations under the broadband USO and state-supported programmes to improve broadband speeds in rural areas. There are several interventions already in progress that will improve network coverage over the review period, and we expect that improvements in rural broadband coverage will remain a priority over the review period. These interventions include the following:

a) In June 2019, we designated BT as Universal Service Provider for the UK excluding the Hull area. From March 2020, end users that cannot access a decent affordable broadband service will be able to request one from BT subject to a reasonable cost threshold of £3,400.

b) The UK Government has announced a range of subsidy schemes aimed at boosting fixed broadband coverage in rural areas. In particular, it has committed £1.2bn over

[938] We focus in this section on the ability of POs to supply broadband services to premises in Market A. However, we are aware that there are other providers of broadband services that target customers in rural areas. While these are not POs they will nonetheless provide an alternative and some competitive constraint where they are able to provide broadband services within Market A.

the next four years to delivering gigabit-capable broadband to the hardest to reach areas.[939]

c) There are also plans to improve coverage in the Nations:

i) The Scottish Government has committed £579m to extending the availability of superfast broadband (at speeds of 30Mbit/s) to every home and business in Scotland through its Reaching 100% (R100) programme.[940] As part of this, a Scottish Broadband Voucher Scheme will provide funding grants to people and businesses in areas unlikely to be covered by the main R100 contracts. The voucher is worth up to £8,500 for SMEs and up to £6,500 for residential premises following an announcement of additional funding for the scheme in October. It builds on work by the Scottish and UK governments to link the SBVS to the UK Government's Rural Gigabit Connectivity programme.[941]

ii) In July 2020, the Welsh Government announced that their Phase 2 Superfast Cymru contract with BT, which is currently building a gigabit capable fibre to the premises network to cover 26,000 premises by March 2021 is to be extended to reach 39,000 premises.[942] The original Phase 2 contract was supported by a public investment of £22.5m, while the extension will be funded by £30m from the Welsh Government and European funding, with additional investment from Openreach.

iii) In Northern Ireland, the Department for the Economy has awarded the contract for the delivery of Project Stratum, a £165 million broadband roll-out scheme, to Fibrus. The project aims to bring next generation broadband services to more than 76,000 mainly rural premises that cannot receive 30Mbit/s.[943]

10.32 At this stage, we cannot say precisely where the new lines will be deployed, or precisely what technology will be used in each instance, because detailed build plans tend to be developed closer to the time that the network is deployed. However, as a consequence of these developments we expect a significant proportion of the premises in areas defined as Market A in 2018 will be provided with an upgraded connection during the course of the review period.

10.33 Where fixed network build is subsidised, contracts typically include access requirements which allow other providers to serve these customers using the network. Where Openreach is the provider of the new lines the remedies imposed on Openreach under the WLA market also apply.

10.34 In response to [✂]'s argument that we should not remove wholesale pricing controls from the WBA market because some end-users continue to face the prospect of being poorly connected for much of the next market review period. We recognise that there may

[939] National Infrastructure Strategy
[940] GBP5bn UK Gigabit Broadband Rollout Starts in Central Scotland
[941] Scotland Boosts Rural Broadband Vouchers by Linking to UK
[942] Extension for superfast fibre rollout
[943] £350m Project Stratum investment to transform connectivity in rural NI

remain a small number of premises who continue to rely on copper-based services by the end of the forthcoming review period. However, the continued regulation of WBA in a very small part of the country would not improve broadband speed outcomes for these consumers. WBA regulation is therefore not a suitable tool for addressing the coverage issues highlighted by [✂]. As set out above, there are a number of other initiatives that seek to improve broadband speeds in rural areas (including WBA Market A) over the review period.

Increase in usage of Openreach's FTTC and FTTP networks by non-BT providers

10.35 Sky, TalkTalk and Vodafone are already present in a large proportion of Openreach's fibre exchanges and make extensive use of the Openreach FTTC network to supply end users with broadband services.

10.36 We also expect that POs will make increasing use of Openreach's FTTP network to supply end users with broadband services. We understand that Sky and Vodafone have already launched FTTP-based services while TalkTalk has plans to offer FTTP services across the country in the near future.

10.37 Furthermore, given the likely expansion of Openreach's FTTP network over the review period, we believe that CPs will be increasingly willing to serve customers over Openreach FTTP connections, even where they would not have been willing to provide ADSL-based services due to the fixed costs of providing services from the local copper exchange. For example, Sky has told us that it intends to use Openreach's FTTP in areas wherever Openreach makes it available.

10.38 We expect that it will become easier for POs other than BT to supply customers in rural areas over the review period. During our 2018 review, some operators told us that they were unwilling to provide services to premises with very slow line speeds (even where they could serve these premises using Openreach's FTTC network) due to the increased level of consumer complaints and risk to brand reputation from serving these lines. These problems should be resolved where rural lines are upgraded with FTTP under the broadband USO or state-supported build programmes.

10.39 Additionally, some POs previously said that they preferred not to serve consumers outside their LLU footprint because they would need to purchase a WLR line (in conjunction with GEA) to provide a copper bearer for the broadband service, and that this complicates their systems and processes. Openreach has now released its SOGEA product, which allows CPs to provide a broadband service without the need for a separate copper bearer.

10.40 Sky already serves some customers using SOGEA and TalkTalk has plans to do so in the near future. POs will therefore be able to supply broadband services to customers both within and without their LLU footprint using the same product (i.e. SOGEA) and without the need for a WLR line.

10.41 We also note that Openreach has made a voluntary commitment in relation to WLR, including committing to offering it on a fair and reasonable basis until its withdrawal in

2025. We address Vodafone's comments in relation to the regulation of WLR in Section 9 of this volume and Volume 3 Section 5.

Conclusion on the appropriate geographic frame of reference

10.42 As set out above we have seen only modest change so far in the ability of POs to supply broadband services into the exchange areas that we defined as Market A in our 2018 statement.

10.43 Over the course of the review period we expect that there will be extensive deployment of new network within Market A and that this will improve the ability and willingness of POs to supply broadband services to customers in Market A in competition with BT.

10.44 Given the uncertainty over precisely where and when those deployments will take place, and noting that market definition is a means to an end, we consider that it is appropriate to use our 2018 Geographic Market definition as a frame of reference. We consider the impacts of these longer-term changes within Market A as part of our assessment of the three criteria test below.

Three criteria test for WBA

10.45 As discussed in Annex 1, in determining whether to identify a market for the purpose of making a market power determination, we must consider whether the three criteria set out in subsection 79(2B) of the Act are met. Where we do not consider that the three criteria are met, we may not identify a market for this purpose.

10.46 In identifying a market, we may have regard to various recommendations or guidelines published by the European Commission, and guidelines published by BEREC, including the 2020 EC Recommendation. Although WBA was listed as being susceptible to *ex ante* regulation (it corresponded to Market 3b) in the Commission's 2014 EC Recommendation, this market has been removed in the 2020 EC Recommendation.

10.47 Given the above, it is appropriate to consider whether the three criteria set out in subsection 79(2B) of the Act are met in relation to the WBA market in Market A, which for the reasons set out above, remains the appropriate frame of reference for application of the test.

Presence of high and non-transitory barriers to entry

10.48 In the 2018 WBA Statement we noted that the significant sunk costs incurred through unbundling exchanges meant that LLU-based entry was unlikely to be profitable in exchanges where the number of customers served by the exchange is small. Due to the small size of exchanges in Market A, their geographical locations (which tend not to map well to POs' backhaul networks) and the increasing focus on fibre broadband, we believed it was unlikely to be economically attractive for POs to roll out LLU in these exchanges over the market review period.

10.49 We noted that POs may also be able to offer services to more premises in Market A if there were additional fibre roll-out by BT (facilitating the availability of VULA) and that it was too early to say what the eventual market impact of SOGEA would be.

10.50 We do not expect further LLU-based entry during this review period. However, as set out in our geographic market analysis above, we expect the availability of VULA-based broadband will expand further into Market A due to continued rollout by Openreach of FTTC and FTTP as part of the broadband USO and government subsidy programmes. We also expect that ongoing improvements to broadband speeds and the expected take-up of both FTTP and SOGEA on the Openreach network on a national basis will make it substantially easier for POs to use those networks to supply broadband services within Market A.

10.51 Considering WBA Market A as a whole, on a forward-looking basis over the review period, we therefore consider that there are no longer high and non-transitory barriers to entry.

A market structure which does not tend towards effective competition within the relevant time horizon

10.52 In our 2018 WBA Statement, we found that no provider has SMP in the WBA market for 98.5% of UK premises, with BT only holding SMP in Market A, containing 0.9% of premises.[944]

10.53 Historically, in the absence of the availability of WBA services, a large proportion of UK premises would be unable to receive a broadband service from a provider other than BT. However, the competitive landscape has changed significantly over the last 15 years and will change further over the course of this review period. The near-universal availability of fibre-based services, combined with a nationwide transition from copper to fibre, means that providers will increasingly be willing and able to serve premises that are within Market A without the need to purchase WBA from Openreach.

10.54 As set out above, we believe that the proportion of premises that cannot receive services from multiple providers will continue to fall significantly over the review period. We therefore consider that WBA Market A will tend towards effective competition over this review period.

The insufficiency of competition law alone to adequately address the market failure(s) concerned

10.55 The three criteria are cumulative and all three criteria need to be satisfied for a market to be identified for the purposes of making a market power determination. Given that the first two criteria are not met we have not considered this criterion further.

[944] The remaining 0.7% of premises are in the Hull Area, where we found KCOM to have SMP in the provision of WBA services.

Conclusion

10.56 It follows from the above analysis that WBA does not satisfy the first two of the three criteria set out in subsection 79(2B) of the Act and therefore Ofcom may not identify it as a market for the purpose of considering whether to make or review a market power determination. Consequently, we have decided to remove all existing regulatory obligations from WBA Market A.

10.57 We do not consider that there is a need for transition arrangements. BT continues to supply WBA to third parties in Market B despite there being no obligation for it to do so and so we do not expect it to cease supply of WBA to third parties in Market A once regulation is removed. We also note that Sky and TalkTalk do not make use of WBA to supply new customers in Market A which further limits any impact of any removal of the WBA remedy on competition in Market A.